ATLAS MAP SUPPLEMENT: SWITZERLAND, AUSTRIA, AND NORTHERN ITALY (page 336)

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WATCH "AMERICANS ON EVEREST" FRIDAY, SEPTEMBER 10, ON CBS TV (page 448)

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NATIONAL GEOGRAPHIC

U. S. Air Force: Power for Peace

By GEN. CURTIS E. LEMAY

Chief of Staff, United States Air Force, 1961-65

IN 1910, scarcely more than half a century ago, a young Army lieutenant took flying lessons by mail from two brothers named Wright. Benjamin D. Foulois and 11 men, with a cracked-up biplane and a budget of $150 for four months, constituted the first United States "air force."*

The youthfulness of American military air power—and the efficacy of that correspondence course in flying—can be measured by the fact that Benjamin Foulois is still alive and active, retired as a major general and former Chief of the Army Air Corps.

Fledgling Corps Grows Into a Giant

My own memories do not go back quite so far—I became an air cadet in 1928. But I have seen transformations leading to the present Air Force that almost defy belief.

What General Foulois started in 1910 had grown by 1928 to an organization of some 11,000 men and 1,100 planes, and a budget of about $20,000,000. Since 1928, the Air Force has increased its manpower 75 times, its aircraft 13 times, and its budget nearly a thousandfold!

With this growth in size has come complexity. The first craft I flew, a training plane known as the PT-3, had a stick and throttle

*See, in NATIONAL GEOGRAPHIC: "Fledgling Wings of the Air Force," by Thomas W. McKnew, and "History Written in the Skies," both August, 1952; and "Fifty Years of Flight," December, 1953.

The Author: Gen. Curtis E. LeMay, here holding a model of the new F-111 variable-sweep-wing fighter, retired last February 1 as Chief of Staff, United States Air Force. Indomitable in his belief in peace through strength, General LeMay earned the Nation's gratitude by revitalizing the Strategic Air Command. He recounts a lifetime of distinguished service in *Mission With LeMay*, written with MacKinlay Kantor, to be published in November by Doubleday & Co. ($7.95). For 14 years he has served as a Trustee of the National Geographic Society.

NEEDLE-NOSED THUNDERCHIEFS, *supersonic fighters, roar past Japan's Fujiyama on the way to Yokota Air Base, one of some 65 U. S. Air Force installations overseas. These Republic F-105's belong to the Pacific Air Forces, whose outposts stretch from Hawaii to Japan and the Indian Ocean.*

and a mixture control; also a tachometer and oil gauge. It had little else—not even an airspeed indicator, as I recall. Its top speed was about 105 miles an hour.

By contrast, today's fighter pilots must scan as many as 100 cockpit instruments and switches, and they can wring as much as 1,600 miles an hour out of their planes.

A mistake today is much more costly than it used to be. The planes of my early piloting days were cheap compared to weapons now. If you made a pilot error, the bill was not high—only $51,000 for a P-12 pursuit plane. Today's B-58 bombers run about $7,000,000 each.

Planes are becoming hideously complicated, as well as more costly. Take, for example, the F-111, now being developed as our No. 1 fighter-bomber; compare it to a plane that is now 12 years old—the F-100 Super Sabre, still the backbone of the Tactical Air Command.

For each Super Sabre, 74 men have to be trained; for the F-111—339. Only 735 different skills, in electronics, aircraft mechanics, airframe repair, and personal equipment, are needed for support of the Super Sabre. For the F-111—1,875.

Because of this complexity, pilots now must be specialists, with far more training in engineering than in the past. Normally they are confined to a single aircraft. The old days of

one pilot flying three or four different kinds of plane are gone.

Yet, in another sense, a pilot must be far more than a specialist. Today an Air Force officer may find himself in a 1,600-mile-an-hour aircraft one day; in a staff planning conference another; in a laboratory the next day; and at a diplomatic conference the day after.

Historic Mission: "Find the *Rex*."

In my early days, instrument flying was unheard of. The crews controlled flight management. We ran out, jumped into a plane, and if it had gas, we took off. Today a pilot never climbs into a plane without detailed planning, and the planning takes more time than the flying.

In the early '30's, communications and operations took most of my time. I ran a navigation school for a while. When we got the first Boeing B-17's—bombers that later won fame in World War II (page 297)—we needed long-range navigational techniques, and adopted the bubble sextant, a modification of the shipboard instrument. It bounced around and gave false readings, so we had to take a number of readings and average them. We used slow shipboard methods of solving celestial triangles. We often needed 40 minutes to compute a line of position. (Contrast

that with today's automatic octant and computer that give a position immediately)

But improvements came fast. In the spring of 1938, as an exercise during Army Air Corps maneuvers along the east coast, we received orders to find and intercept the Italian ocean liner *Rex*, some 700 miles out in the Atlantic.

Our fledgling air arm had been seeking just such an opportunity to demonstrate the capability of its long-range bombers. Three B-17's were detailed to conduct the search, and I was assigned as navigator in the lead aircraft.

We took off early on the morning of May 12, with little information about the position of the *Rex*. The weather was poor and rapidly becoming worse. This was at best a difficult mission, and pressure on the crew was not reduced by the fact that there was aboard my aircraft an NBC radio reporting team with a nationwide news broadcast scheduled for 12:30—based on my estimate of the time we would intercept the liner.

Perhaps you can imagine our state of mind. We were fighting for the recognition of air power as an instrument of national security. Suppose the *Rex* had been an enemy? Would we be able to find it? What if we failed?

The B-17's droned on. I figured and refigured our time of intercept.

Noon came and went. I revised the estimated intercept to 12:25. The minutes dragged by. Black clouds swirled all about us, more often than not obscuring the sea.

Finally, at exactly 12:25, we passed over the liner. A crew member's shout of "There she is!" almost blasted off our headsets, but no one cared. We had proved our point. We had shown that air power had the potential of protecting the Nation from sea attack.

More important, we had demonstrated the

Newly commissioned, Lieutenant LeMay wears the goggles and leather helmet that marked pilots of the open-cockpit planes of the early '30's. The man who took this picture misspelled the young officer's name.

In a B-29 bombardier's "greenhouse," Dr. Gilbert H. Grosvenor, then the Society's President and Editor, flies with Maj. Gen. Curtis LeMay, just back from Pacific service in World War II. They travel to Rapid City, South Dakota, for the 10th anniversary of the 1935 stratosphere flight of the National Geographic–U. S. Army Air Corps balloon *Explorer II*.

Historic mission achieved: With LeMay as navigator, Army Air Corps B-17's fly 700 miles over the Atlantic to find the Italian liner *Rex*, demonstrating that long-range bombers could carry out precise navigation over long distances. This feat in 1938 was accomplished with none of today's radar or advanced navigational instruments.

U. S. Air Force Photographic

long-range bomber's capability for precise navigation over great distances—a capability that was to prove valuable a few years later, during World War II.

Recently, during the Cuban crisis of 1962, aerial reconnaissance was so good that within 24 hours of getting the go-ahead we had located and were keeping tabs on some 2,000 ships bound for Cuba or in its vicinity.

Air Force Power Exists for Peace

Aside from the phenomenal change in machines, I see a considerable change in the men of the Air Force. I think perhaps the biggest difference between Air Force officers now and 40 years ago is a sense of urgency. When I came in, we were at peace. We felt that if war threatened, there would be time to increase the size of the force and train new recruits.

The Cold War and modern weapons have changed all that. We no longer have time to prepare. We must be ready immediately.

Although the Air Force is geared for instant war, its mission is peace. The men of the Strategic Air Command, which I had the privilege of reorganizing in the late '40's, chose as their motto, "Peace Is Our Profession."

And they really mean it. All too many of the men in the Air Force today experienced combat in World War II and in Korea. They never want to go through anything like that again. That is why these men will accept so many hardships, why they will work 70 and 80 hours a week in the struggle for professionalism and perfection.

As you read the following article by NATIONAL GEOGRAPHIC senior staff writer Kenneth F. Weaver, you will see how the Air Force carries out its belief that the best way to maintain peace is to be stronger than any-

Summit of a career: General LeMay takes the oath as Chief of Staff from Air Force Secretary Eugene Zuckert. Observers at the White House include President Kennedy, Vice President Johnson, former Air Force Secretary W. Stuart Symington (extreme left), and two former chiefs of staff, Gen. Thomas D. White (upper right), and Gen. Carl A. Spaatz (second from left).

one else. It's as true today as it was when George Washington said, "If we desire to secure peace.... it must be known that we are at all times ready for war."

Technology plays a vital role in maintaining that readiness. If you draw a curve on graph paper representing the performance of the airplane since it was invented about 60 years ago, the curve rises very slowly at first, then begins to soar at a steeper and steeper angle. Right now that curve is shooting straight off the paper. For example, the B-52's engines—and those of all other Air Force jets—have a ratio of thrust to weight of about 5 to 1; that is, the engines have a thrust in pounds five times as great as their own weight.

Backbone of the Air Force: Men

Although it may take ten years or more, our research and development program can now promise engines with a ratio of as much as 15 to 1. This will obviously mean huge increases in range and load. Contractors are already planning the C-5, a wonderful cargo plane that should be able to lift 100 tons from a short runway or carry as many as 600 troops.

Speed, too, is going up rapidly. Operational aircraft have been lagging about a decade behind the experimental rocket-powered X-15, which flies today at more than 4,000 miles per hour.* Therefore, in the decade ahead, we will probably be approaching the X-15's present performance.

When you get to such speeds, fantastic temperatures on the surface of the plane would soften aluminum airframes. New heat-resistant materials are needed, such as titanium, or other metals impregnated with boron fibers. The XB-70, which uses titanium, pipes its fuel on the way to the engine through high-temperature areas to help absorb the tremendous heat of supersonic flight.

We are now in the first crude, early stages of space exploration, about where aeronautics was in General Foulois's early days. No one then could foresee the fantastic weapons and materials we have today, and no one now can really foresee the most valuable things we will find and learn out in space. But we've got to get there and find out, and there's no doubt in my mind that we will.

This is exactly why we will always need manned systems—manned planes, manned spacecraft. Missiles are spectacular and they play their role, but they have no sense of loyalty; they can't think; they can't be recalled.

War is an art, not a science. No one today can say what the next war will be like, or where it will start. If there is a next war, we're going to be surprised. The enemy always tries to surprise you, to catch you off guard. Therefore you must have some weapon systems that are flexible, so that when you are surprised, you can do something about it. The missile is not very flexible, but a man can think and change his mind.

I have always believed strongly in what men can do if they are trained and motivated properly. I remember, during my days at tactical school, listening to a lecture on leadership and discipline. The teacher told of a conversation with a German officer after World War I. The German said that he couldn't understand Americans. They had no discipline. You had to give them orders, and then you had to explain why.

I think the German officer missed the point. It has been my experience that if you explain *why* to an Air Force man, you don't have to give an order. You just get out of the way and let him get on with the job! ✱ ✱ ✱

His cigar a hallmark. General LeMay attends a reception following retirement ceremonies. One of the Nation's most honored military men, he holds decorations of 20 lands.

Rain of destruction: B-17 Flying Fortresses drop salvos of 500-pounders during a saturation bombing of Hitler's Europe in 1944. In waves of hundreds, Allied planes shattered Nazi war strength with bombing techniques—close formation and simultaneous drops—pioneered by LeMay.

*See "I Fly the X-15," by Joseph A. Walker, NATIONAL GEOGRAPHIC, September, 1962.

Of Planes and Men

U. S. AIR FORCE WAGES COLD WAR AND HOT

By KENNETH F. WEAVER
National Geographic Senior Staff

Illustrations by National Geographic photographers EMORY KRISTOF and ALBERT MOLDVAY

ENGINES STRAINING, *an Air Force C-123 leaps from a short runway at Khe Sanh, northernmost U. S. outpost in Viet Nam. Guard watches for Viet Cong snipers. Going aloft for the first time, Vietnamese troops (opposite) gasp at the sudden liftoff.*

A MILE BELOW ME the red lights of helicopters winked fitfully, like fireflies, in the Vietnamese darkness. Suddenly a parachute flare cut through the night with the glare of a million candles, mirrored in the twisting waterways of the Mekong Delta.

We could just make out the lonely outpost below, but not the stealthy figures of Viet Cong insurgents attacking it. Now fighter planes, guided by the flare, swept across the scene to rain explosives and shells on the guerrillas. An explosion's concussion nudged our plane; I saw an awesome yellow "rose" blooms along a bend in the river. Dashed lines of fire—streams of tracer bullets—stabbed

venomously from the fighters to the ground, and answering streams rose skyward. Some probed toward us, fading out like spent Roman candle balls.

The attackers melted away, but for more than an hour our United States Air Force plane—code-named Smokey Red—circled, dropping 70-odd flares to keep the embattled fort alight (next page). At one o'clock in the morning, our fuel nearly exhausted, we turned the flare mission over to Smokey Blue and headed back to Tan Son Nhut Airport near Saigon, where our patrol had taken off at dusk.

The Fairchild Hiller C-123 Provider in which I was riding is one of the smaller Air

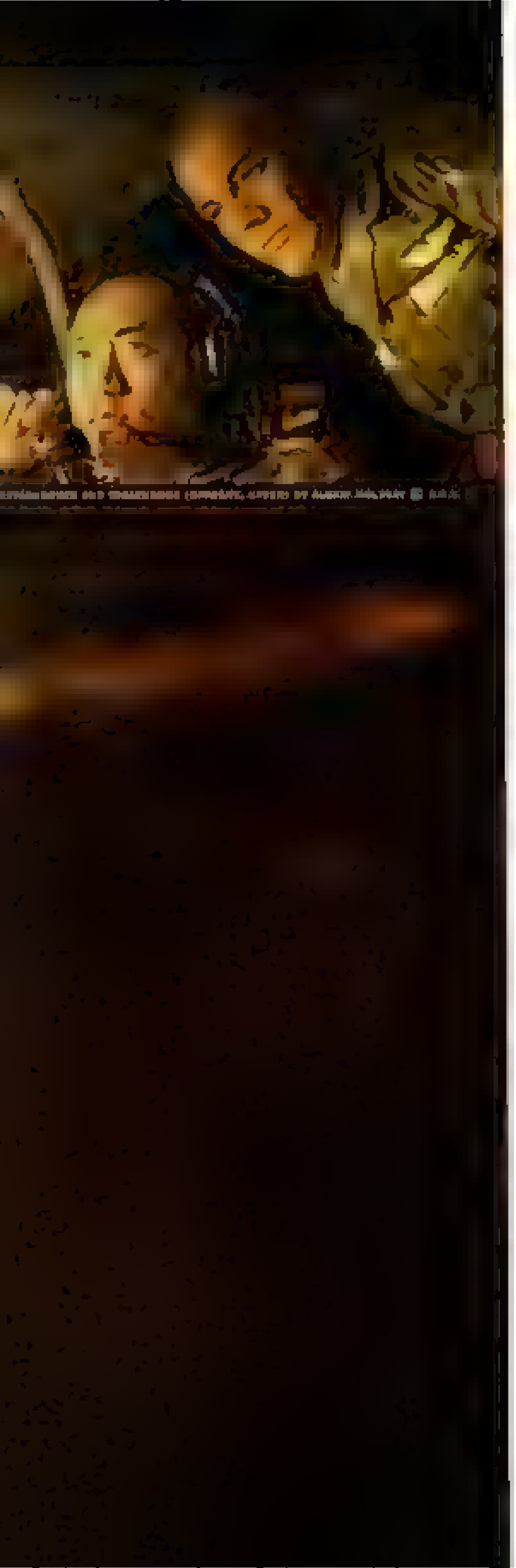
ATTACHED FLARES AND PARACHUTES BY ALBERT MOLDVAY © N.G.S.

Night strike over Viet Nam

DRIFTING PARACHUTE FLARES light a small but deadly battle in South Viet Nam's Mekong Delta. Faint trails lead to a fortified hamlet; its fuel dump, fired by Viet Cong mortars, glows at far right. Streaking tracer bullets from diving Skyraiders zero in on the foe.

A mile above the battle (left) C-123 crewmen load flares into chutes to be shoved out at the pilot's signal. The magnesium torches, each with a million candlepower, reveal guerrilla moves.

"Where's the enemy?" asks the Vietnamese navigator in the flare plane (right). He radios defenders to learn Viet Cong strong points. U.S. officer directs the Skyraiders.



Jerry Weem Lure Uses Lures Plastics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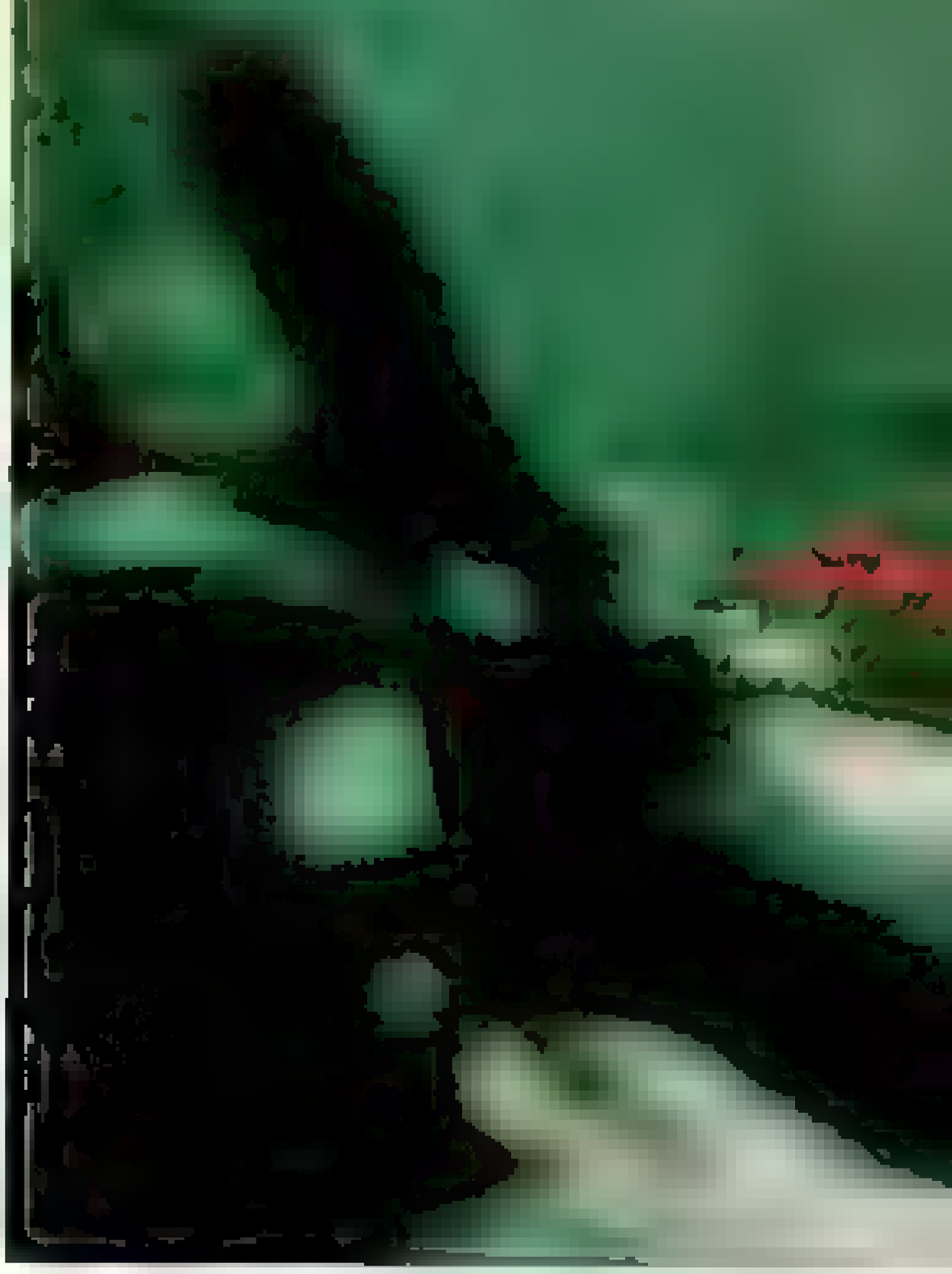
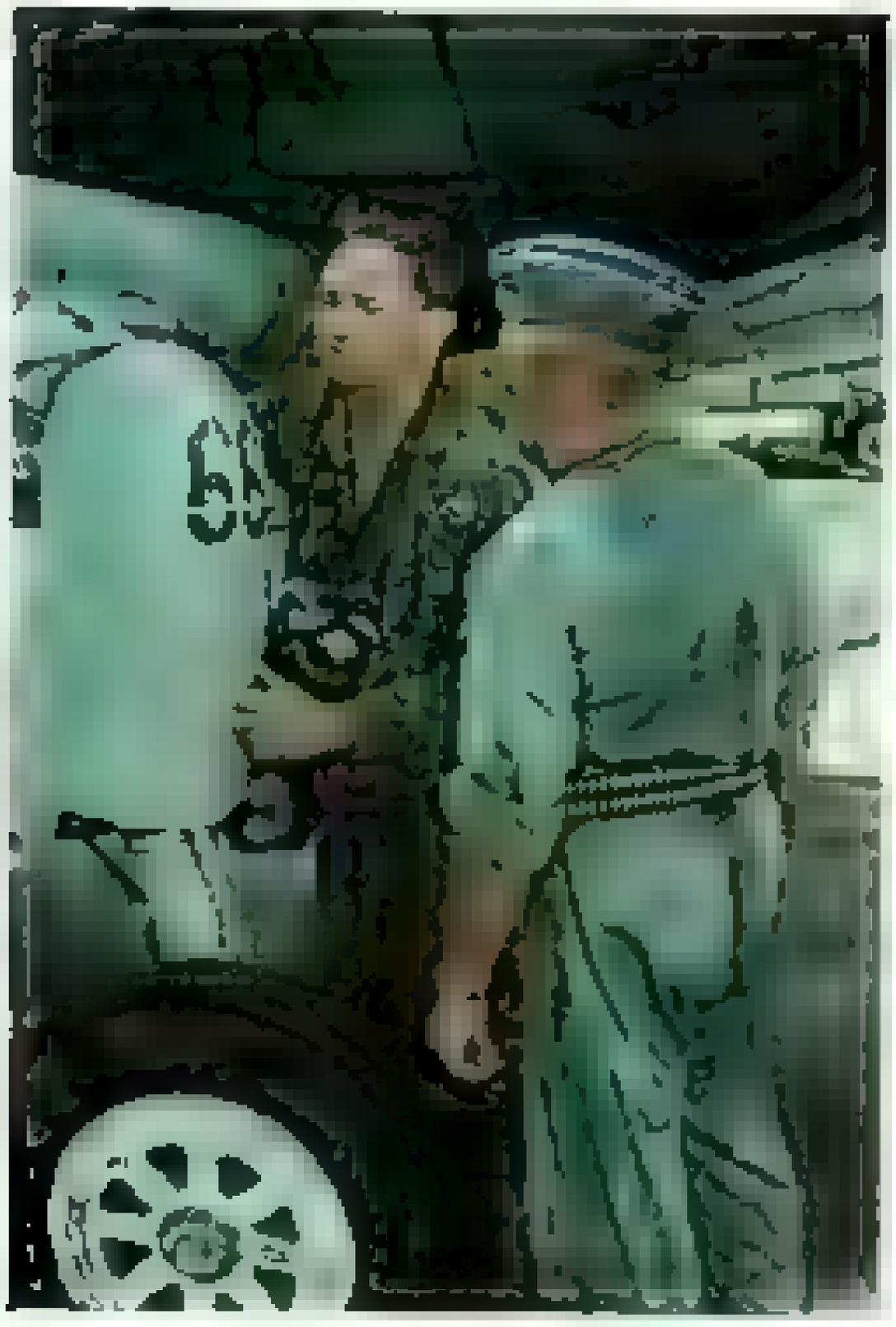
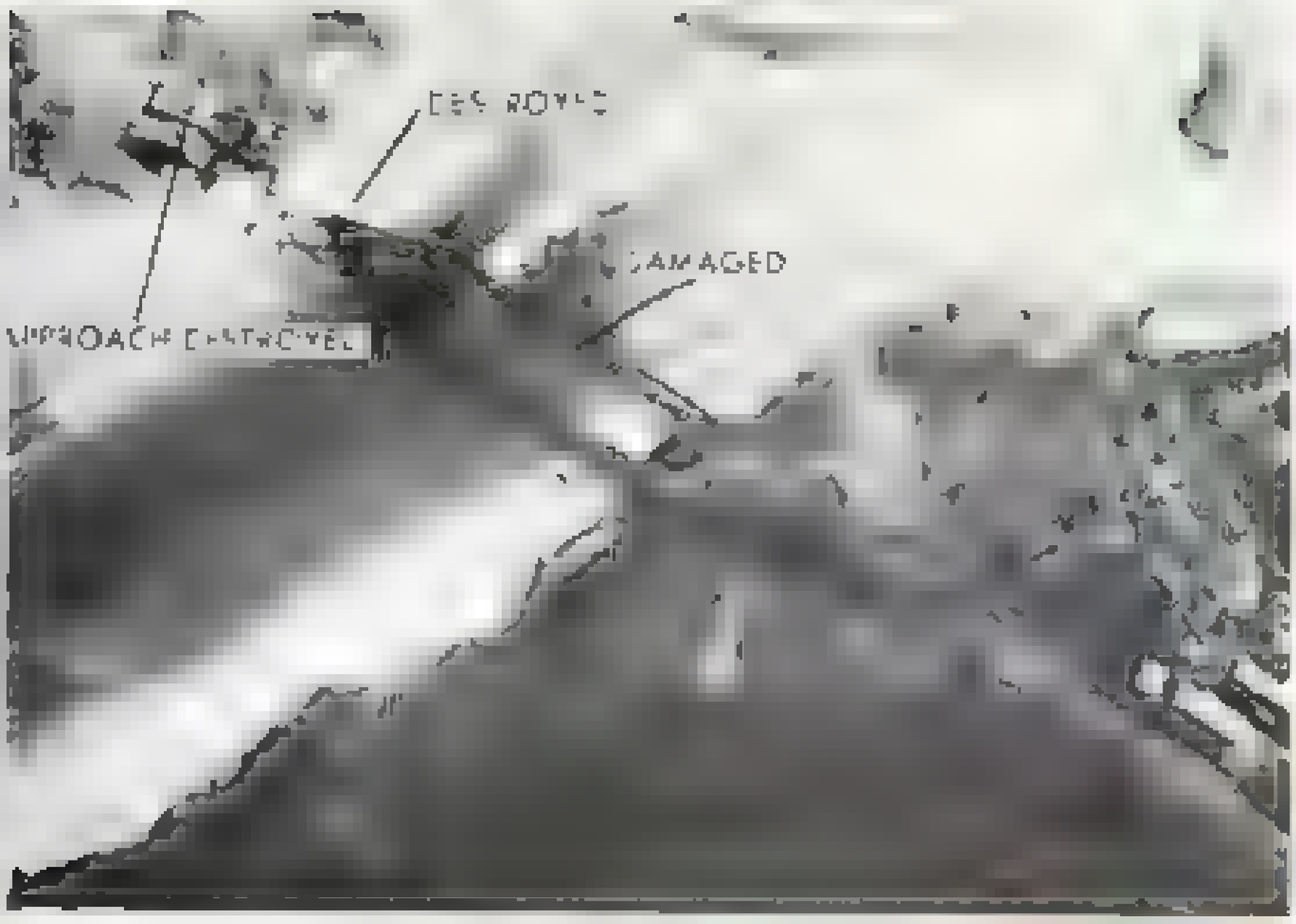
Concerned Crowd Towards Snipers



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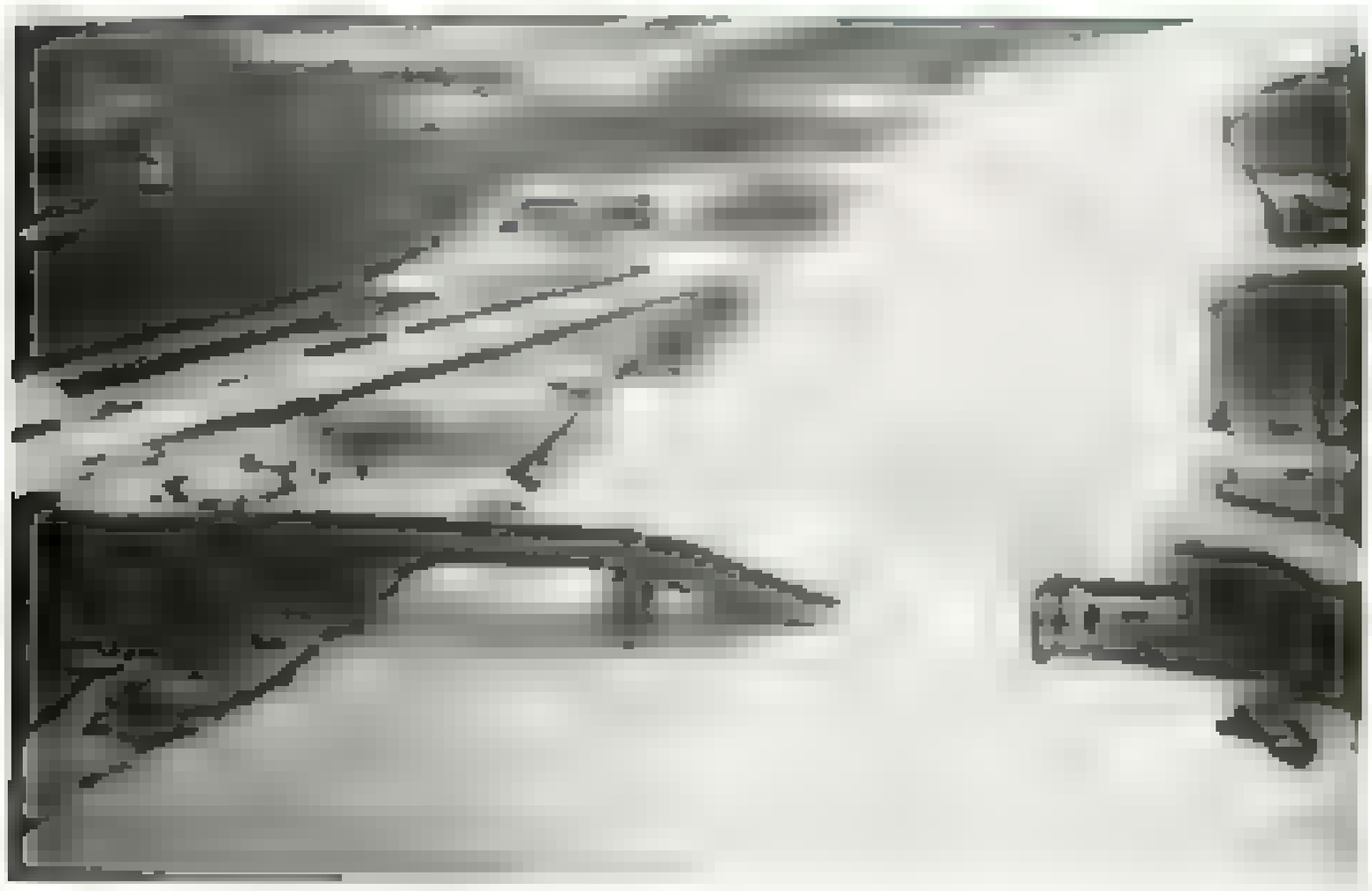
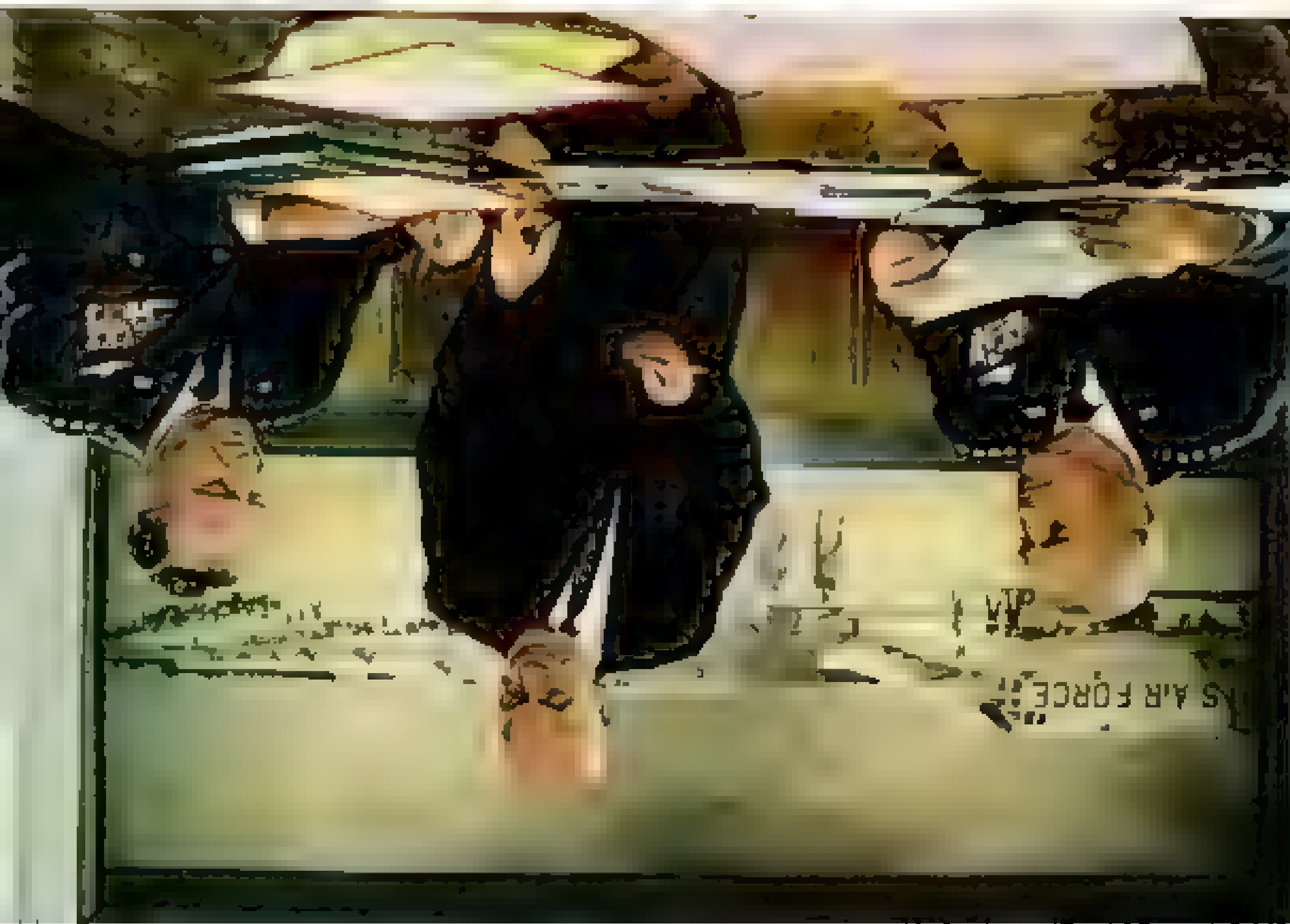



S AIR FORCE

For every B-52 on alert, six crewmen and three ground-crew members must live for three to seven days at a strategic base on "dera pad" in guarded, fenced seclusion near the runway. Attractive quarters and underground bedrooms (to cut down on jet noise) help make this solitary life tolerable. But the men must live and sleep in flying suits, with zippered boots that can be pulled on in seconds.

"If the klaxon sounds while we're here," Lt. Col. John H. Voss advises, "get out of the way fast, or you'll be run over. It's a matter of pride—as well as national security—to get those planes off the ground in the fewest seconds possible, and they can do it in lots less than 15 minutes."

During practice scrambles, B-52's take off at 15-second apart, staggering in the boiling turbulent jetwash of the planes ahead.

SAC's crews work an average 74-hour week. Even on alert they put in full days studying, practicing in simulators, plotting the endless details of practice bombing runs, and memorizing target data. Each radar-navigator must be able to draw from memory what his assigned target looks like on radar. Each pilot must know his route like a taxi driver every day he is briefed on the weather along the way.

Night Mission "Bombs" U. S. City

Few Americans know it, but many of our cities are "bombed" at night by SAC crews whetting the fine edge of their readiness. I flew on such a mission with a B-52 crew of the 28th Bombardment Wing at Ellsworth.

Our aircraft commander (that's what the Air Force calls a pilot these days) was 28-year-old Capt. Thomas R. Ferguson, Jr.—astonishingly young I thought, to bear responsibility for a $6,000,000 plane, the lives of half a dozen men, and, when on alert, the equivalent in nuclear bombs of millions of tons of TNT. Ferguson shows all the crisp ability to command and the self-assurance of all the SAC colleagues, who average 34 years of age and 3,700 hours of flying.

Latched on flood, glistening B-52 looked even bigger than it was as I climbed the ladder through a trap door near the nose. I found the six-man crew already strapped in their seats, going through the long checklist ritual, testing electric and hydraulic systems, warning lights, and controls.

Shoulder-harnessed, Captain Ferguson took the huge bird smoothly down the runway. We climbed swiftly. The sensations were not unlike those in a commercial airliner, except for the two-mile run on the ground and the hermetic feeling in this almost windowless plane.

A mixture of air and oxygen fed steadily through a flexible green hose into my face mask. Helmet and earphones reduced the plane's heavy roar. I could clearly hear members of the crew and the controllers on the ground in frequent communication as we droned on through the night.

I became aware of a muffled, rapid bang-bang-bang-bang. "It's just our radar in the nose sweeping back and forth," Ferguson reassured me. Soon a blip showed on the radar-scope. Another plane, our tanker, was making rendezvous with us.

Planes Lock Together for Refueling

Presently, just ahead, I saw moonlight gleaming on the silver fuselage of a Boeing KC-135, the big jet Stratotanker that enables SAC bombers to go anywhere in the world and return without landing.

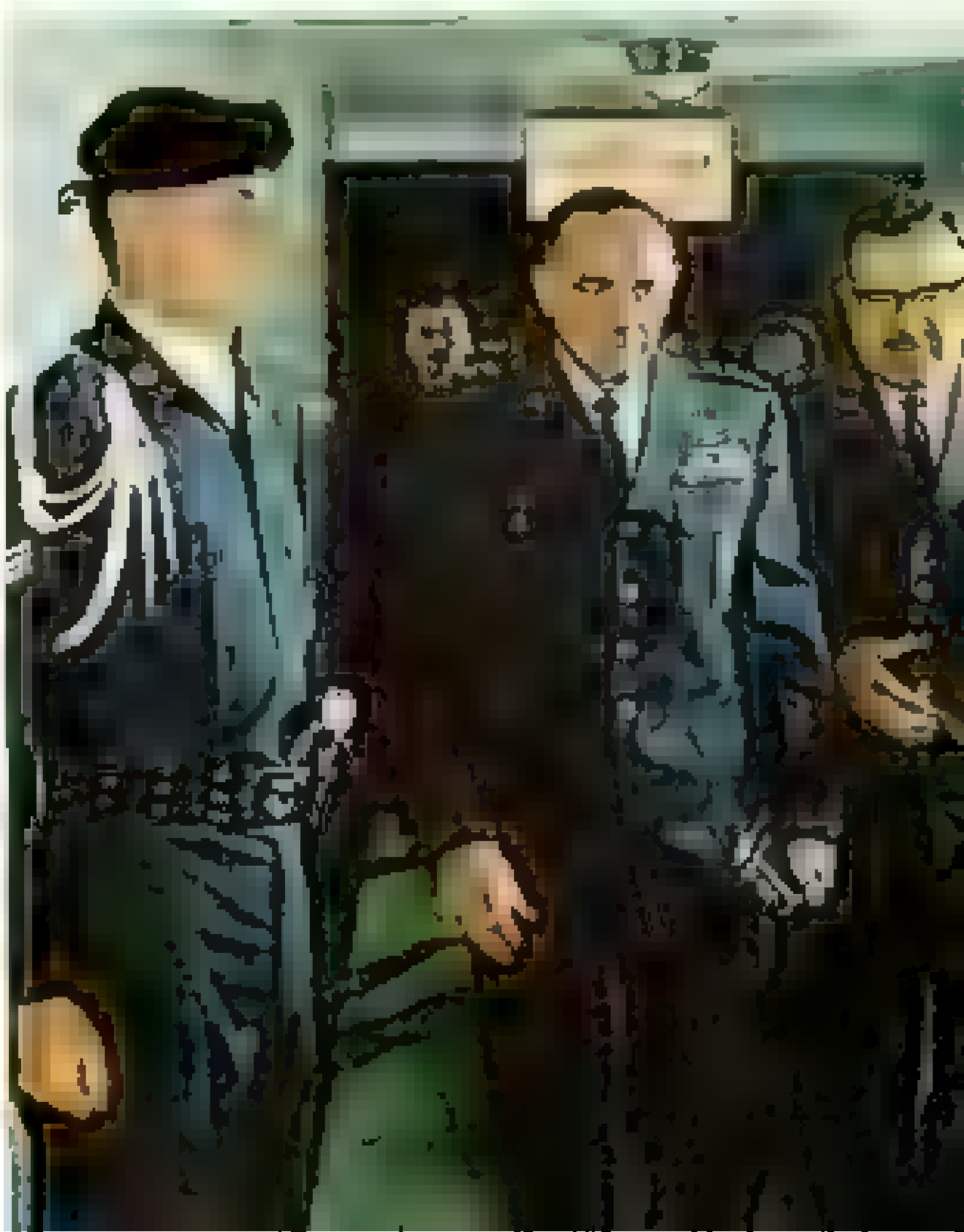
As we gradually closed, a long boom under the tanker's tail dropped down and extended 3 and 4 feet toward us. Two small vanes behind the operator "fly" the boom into position.

Now Ferguson and his copilot hunched forward in their seats, intent on lining up with a row of lights on the tanker's belly, while the "boomer" in the tanker called off the distance. The boom waved slightly, for an instant I thought it would plunge through our cockpit window, but at the last moment it rose gracefully and passed over.

"Stand by for contact," the boomer's voice crackled, with a sharp clunk the boom's nozzle locked in its receptacle just behind us. Now we drank in fuel at more than 6,000 pounds—nearly 1,000 gallons—a minute.

For more than 20 minutes these giants roared along at 300 miles an hour, five times such as through welded together. Only by the pilot's constant adjustments in throttles and rudder could I appreciate how tricky and dangerous this operation can be, especially during an alert. Yet, on the average, every 45 minutes around the clock an hydrotanker SAC bomber refuels somewhere in the world (pages 316).

Through the night our B-52 zigzagged hundreds of miles across the Dakotas, Nebraska, and Wyoming. About 2 a.m. we began a high-level bombing run at 32,000 feet. I wormed my way down to a windowless cubbyhole in



[illegible] of Bravery

[illegible]

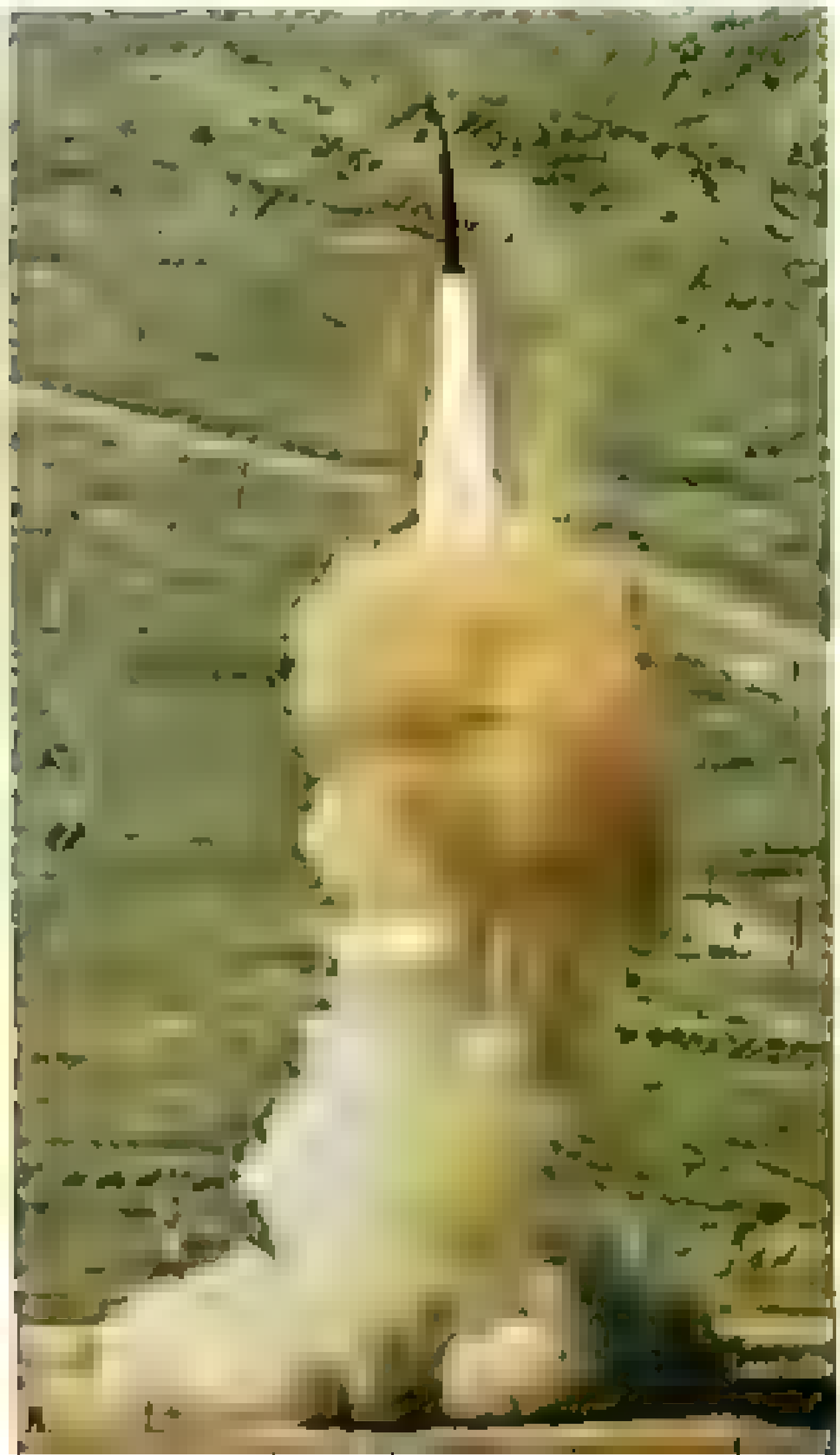
[illegible] Stories of Attempts to [illegible]

[illegible]

[illegible]

[illegible] A warlord insists that a [illegible] radar is searching for the number [illegible] The FW [illegible] [illegible] that [illegible] Chinese [illegible] that [illegible] the [illegible] screens will [illegible]

[illegible] the FW [illegible] And [illegible] he knows that [illegible] [illegible] venture [illegible] [illegible]



U.S. Air Force
ROUND THE GLOBE

Commands, Agencies · Overseas Air Forces · Bases, Sta

Base · Air Force Base · AB · Air Base · AS · Air Station

SAC Within some 50 bombers and tankers and more than 850 missiles, the Strategic Air Command stands as the United States chief deterrent to nuclear war. Its 250,000 highly trained men operate the most destructive weapon systems science can devise, both in the air and at scattered bases around the world. (Page 10) Provides

TAC The worldranging Tactical Air Command's war ready 70,000 men in 37 fighter squadrons and airlift and support units provide a squadron providing air and ground support units capable of fighting limited or all-out war. It extends its range by borrowing SAC tankers for aerial refueling. TAC elements also join the U. S. Army in the combat training of highly mobile United States Strike Command.

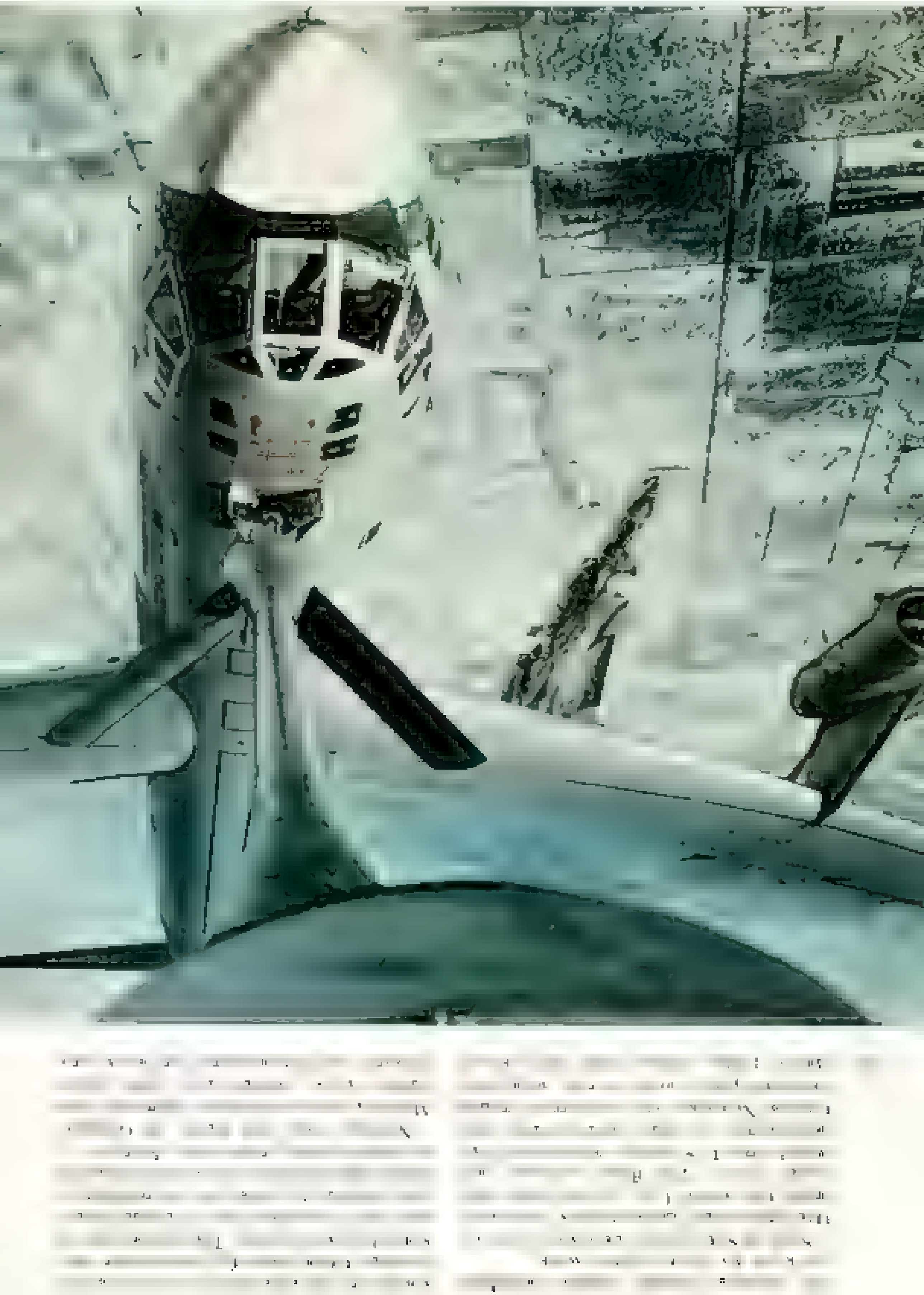
ADC uses its Distant Early Warning Line (DEW Line) and Ballistic Missile Early Warning System (BMEWS) to guard the North American continent against aerospace attack. It also supplies interceptor aircraft and surface-to-air missiles to the NORAD commander (page 33).

MATS The Military Air Transport Service gives the Department of Defense a global airlift capability, flying some 600 cargo and passenger carriers over 150,000 miles of air routes. Other activities: aeromedical evacuation, aerial mapping, air rescue and weather reconnaissance.

USAFE American bases over allied airfields. U.S. Air Forces in Europe has more than 100,000 active and 60,000 personnel in NATO partners countries mainly and provide airlift and logistic air support for Allied ground forces over an area of 4.3 million square miles from Iceland and Western Europe to Asia and Africa.

PACAF Pacific Air Forces built warfare in Japan and approximately half the U.S. Pacific with strategic defense and global mobility. Together with British, Australian and New Zealand air units it covers the Pacific Ocean and eastern Asia, or 1/4 percent of the world's surface.

Powerful missiles—Titan and Minuteman—poised at underground sites in the United States can strike any point on this map and beyond.



Cramped [illegible]

Pilot's gloved hand [illegible]

[illegible] the consulted crew [illegible] instructed to attack [illegible] The crew [illegible] back unless it gets the "go" [illegible]

[illegible] the doctrine of deterrence [illegible] fully [illegible] advanced by Gen. Curtis E. LeMay, who retired last February after [illegible] as SAC commander and three years [illegible] Air Force Chief of Staff. The Air Force relies on its defensive strength plus a mixed force of bombers and missiles to deter enemies from attack. For [illegible]

Titan's Computer Wears Constant

The newest of our missiles—the solid fuel [illegible] which SAC now has [illegible] Titan 800 miles 312 [illegible] and the extremely powerful liquid fuel [illegible] Titan II of which there are [illegible] within seconds from their concrete [illegible] silos. They [illegible] obliterate any [illegible] nation on earth reaching their farthest [illegible] within 30 minutes. Nobody has yet perfected a weapon capable of stopping [illegible]

Missiles are a most living thing. [illegible] when I went down into a Titan II silo at Little Rock, Arkansas, Titan's four-man crew [illegible] underground complex for 24 hours at a stretch. Elaborate air conditioning [illegible] keeps the missile [illegible] at 70 degrees, at 30 percent humidity. [illegible] the sophisticated environment package which [illegible] the missile on target must be kept [illegible] warmed. Inside, a gyroscope and computer are always running, ready for that possible moment when the Titan's [illegible]

As I [illegible] with the crew at the bottom of [illegible] the gleaming aluminum shaft of the missile towered above us like a giant [illegible] rocket. Then we rode up the elevator to view the warhead. Its devilish power, calculated in megatons—millions of tons of TNT—is, of course, secret. But Col. Peter H. Spear, commander of the 3[illegible]rd Strategic Missile Squadron, gave me a thought-provoking illustration.

How many freight cars do you think it would take [illegible] a five-million-ton explosion?

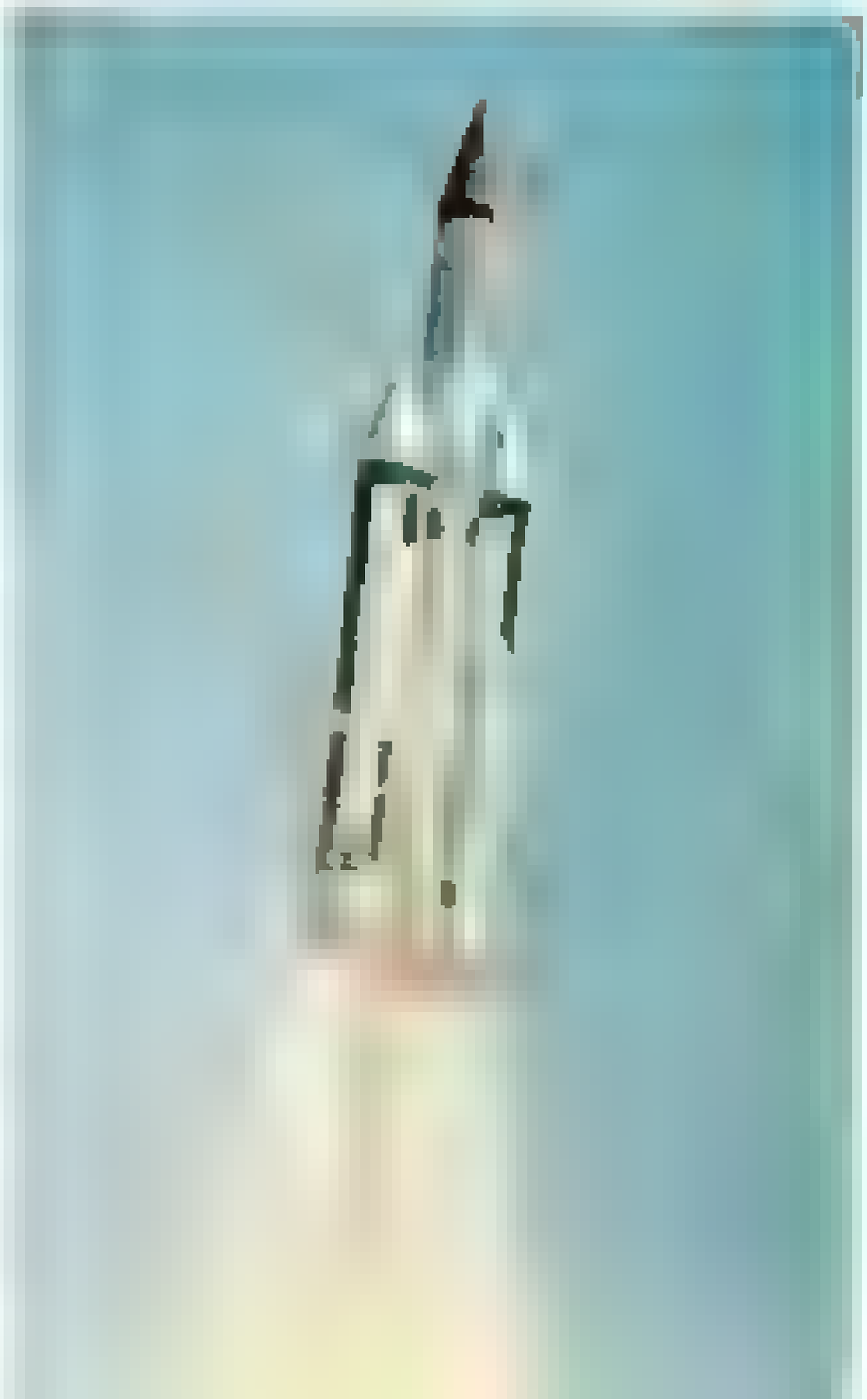
My guess was a train 5[illegible] miles [illegible]

He smiled. "We [illegible] would have [illegible] was from Little Rock [illegible] Canaveral, a good 1,4[illegible] miles away. [illegible]

Separating in space, a rocket [illegible] away from the proposed Air Force Manned Orbiting Laboratory [illegible]

World's most powerful rocket, Titan II [illegible] Cape Ken[illegible]

[illegible] Air Force



[illegible] Air Force view [illegible] always necessary to have another, [illegible] striking force [illegible] manned bombers that can be recalled or diverted and that can [illegible] the air [illegible] are [illegible] knocks them out.

Gen. John P. McConnell, Air Force Chief of Staff, says [illegible] "I am convinced that for the foreseeable future we will continue to need a considerable [illegible] of bombers and a variety of other manned [illegible] that we must replace [illegible] with newer and better ones."

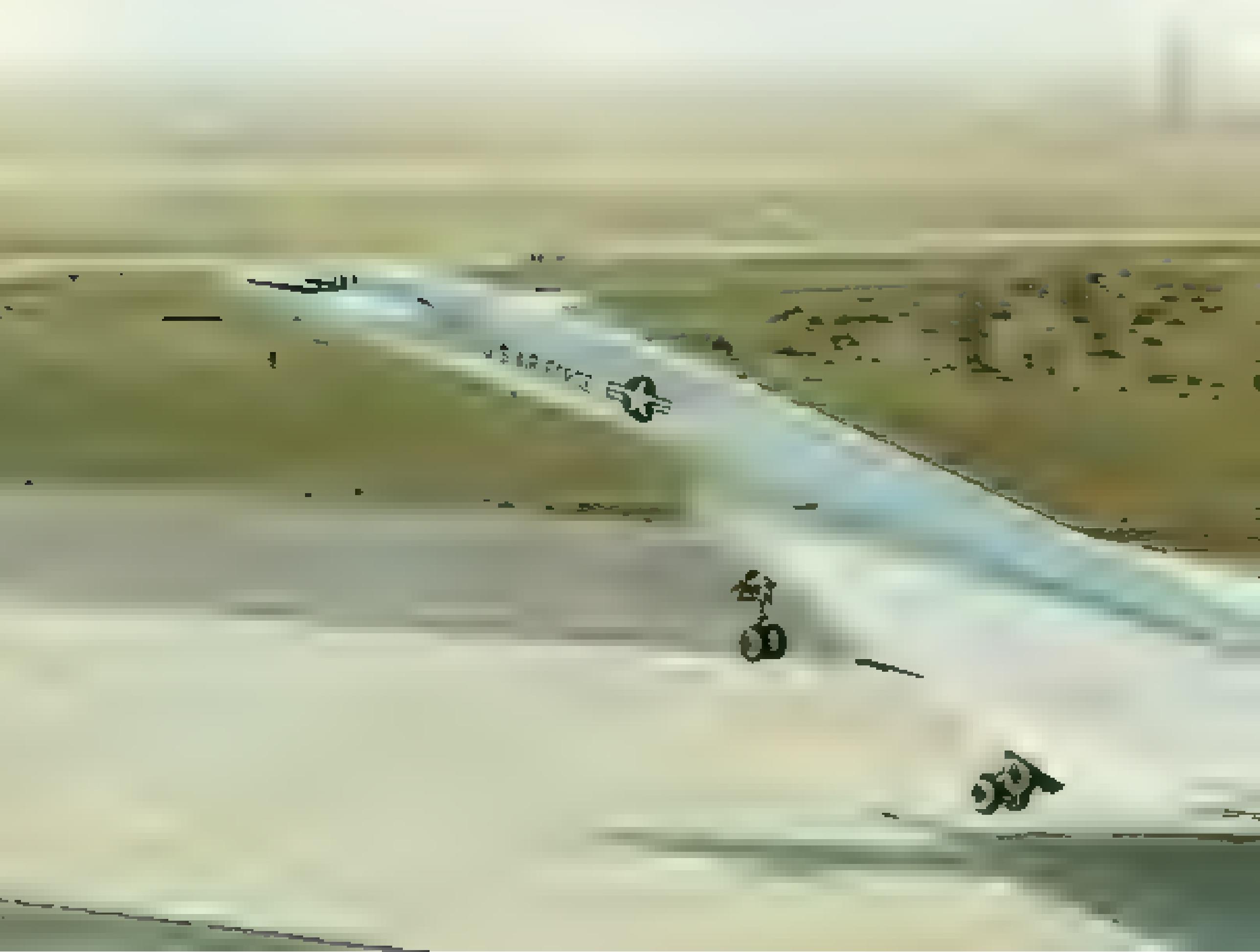
But the question that troubles many Air Force planners is: How soon? Our aging fleet [illegible]—the jet bombers that preceded [illegible] are currently scheduled to be retired next year. How soon will a fleet of bombers be needed to replace the B-52's and [illegible]?

The latest model B-52, a [illegible] jet plane with a fuel capacity for 12,500 miles, was delivered three years ago, and the oldest models are ten years old. In today's fast moving technology, this plane approaches obsolescence in a decade.

The new B-58 Hustler is [illegible] planes [illegible] two years ago [illegible] world's [illegible] estimated [illegible] number. This remarkable [illegible] half-mach [illegible] and [illegible] the size of a B-52 [illegible] at [illegible] bombs externally. It is shaped like a boomerang [illegible] of plastic [illegible] fiber and stainless steel to withstand the tremendous heat of air friction when the plane "takes off" at 2,325 miles an hour [illegible] speed warning device alerts a B-58 pilot to trouble. He may see a blinking red light and hear a pleasant female voice [illegible] "Check for engine fire" or "Landing gear [illegible]." The [illegible] hot.

These [illegible] attention [illegible] pilot told me: "[illegible] a model airplane [illegible] voice—but you [illegible] a wrong [illegible]."

Impressed as I was by the B-58, I confess a surge of [illegible] when I first



[illegible] great expense [illegible] Palmdale plant in California [illegible] watchdogs raced [illegible] the run-

[illegible]

Research Becomes XB-70's Role

Mach 3—[illegible] the XB-70 was designed to ride [illegible] but it will never be [illegible] first [illegible] Mach [illegible] est, [illegible] joseph [illegible]

[illegible] to make supersonic transports.

The size of the plane [illegible] jets that will fly at Mach 3 and [illegible] resistant materials [illegible]

[illegible] and F—about the meeting point of [illegible]

A rather new prime that hands [illegible] where is the Convair Division [illegible] once called the [illegible] This center [illegible]

With [illegible]

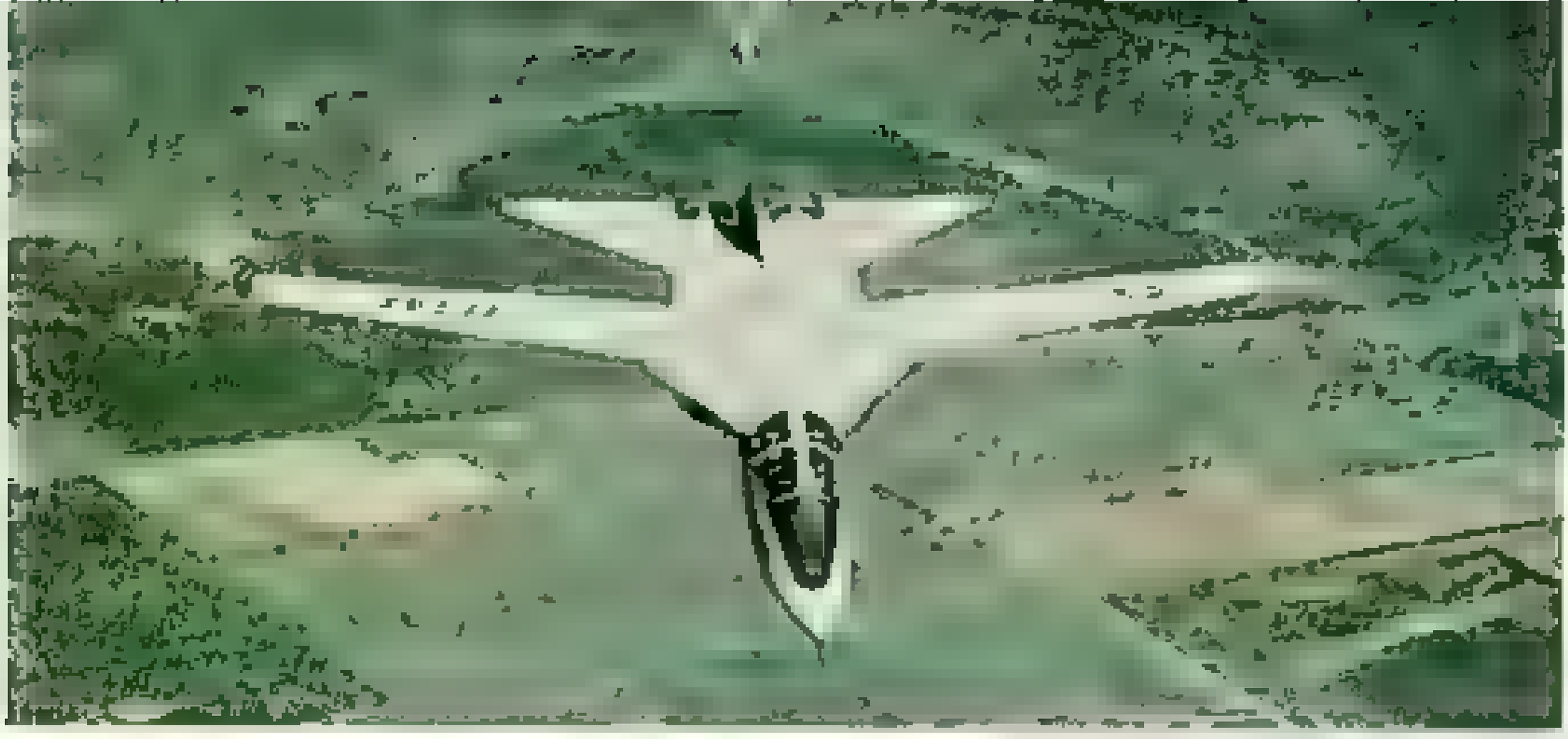
[illegible] then, at [illegible] the plane can fly at [illegible] miles an hour—with enough fuel [illegible] the Atlantic [illegible] next page. But even [illegible] while the [illegible]

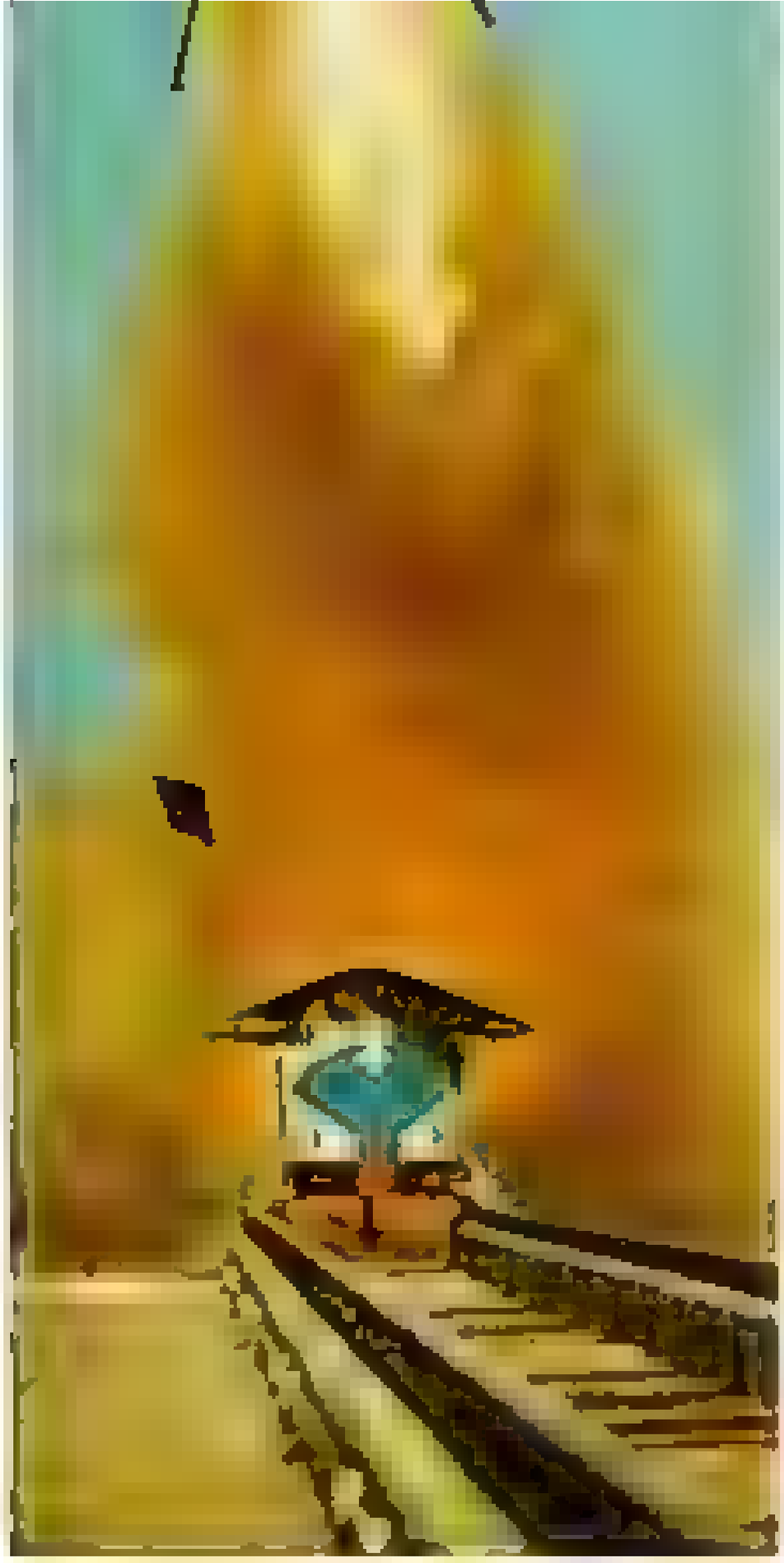
[illegible] propulsion we sit in the two-man cockpit, [illegible] feet above the ground and some 1[illegible]5 feet from [illegible]

Miniature planes, [illegible] designed in stainless steel [illegible]

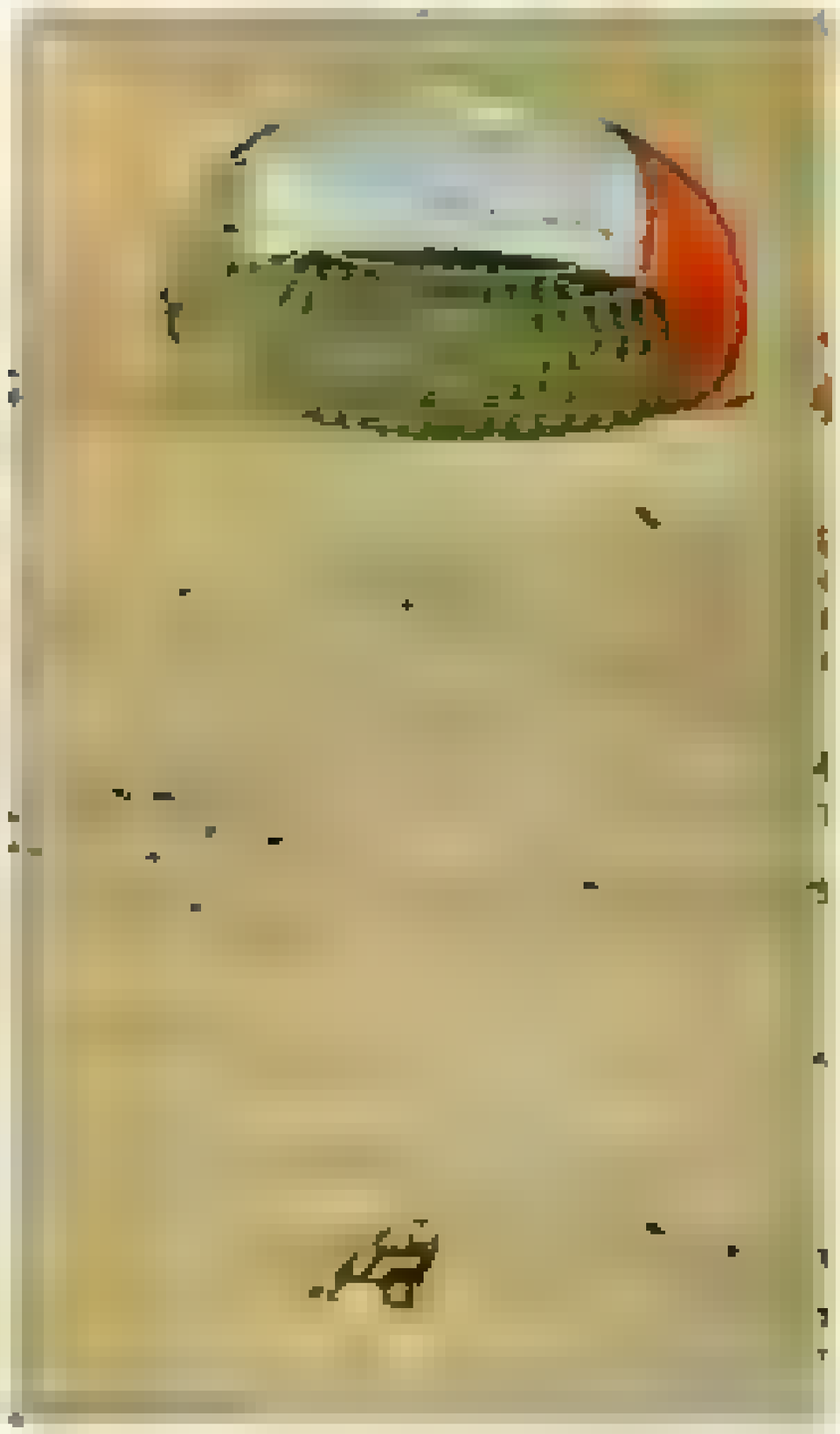
Like a [illegible] [illegible] from [illegible] [illegible] must [illegible] [illegible] miles an hour [illegible]

[illegible] the [illegible] of a XB-3 transport





Escape from danger: The [illegible] during tests at the [illegible] Air Force base, New Mexico, an escape [illegible] class loose from a mock-up [illegible] set trickering down a track at 55 mph [illegible]



Flying switchboards: [illegible] [illegible] weeks of [illegible] [illegible] Boeing E-4A aircraft which can [illegible]

Weather SAC ever uses the E-4A [illegible] will be a mission for the Tactical Air Command [illegible] as gently [illegible]

Military Weather [illegible]

[illegible] aircraft such as those [illegible] satellites

Reception, interpretation and dissemination [illegible] is centered in NEPHAL. In [illegible] American Air Defense Command [illegible] ADC (Air Defense Command) [illegible]

America and [illegible] [illegible] 150,000 people at first [illegible] A. Cultural [illegible] NORAD.

Display panels (foldout, next pages). Information comes in here from a net of electronic [illegible]

Early Warning Line, stretching from Alaska to [illegible] 15 states in the United States [illegible]

GLOWING SYMBOLS give instant information. Numbered half-arrows mean aircraft—red for hostile, orange for unknown, green for planes of special interest. Star means friendly aircraft carrier; triangle, Soviet-bloc "fishing" trawler.

ENEMY BOMBERS from Cuba? In this hypothetical exercise, Florida's Communist neighbor shows on enlarged section (right) of map above. If the arrows move steadily toward the U. S., NORAD sends interceptors aloft to identify and—if need be—turn back or destroy the invaders.

NORAD: Vigilant guardian of North America's defense

IN THIS darkened chamber at Colorado Springs, electronic wizardry analyzes and displays any threat of war and U.S.-Canadian readiness to meet it. Here converge nerve impulses from hundreds of sky-sweeping sensors, including BMEWS, DEW Line, and far-ranging radar planes. Day and night, technicians of the North American Air Defense Command man the consoles, alert for sign of attack. In time of crisis, or for exercises like this one, decision-making generals fill the glassed-in observation room. Here, during the simulated attack, white ellipses (far left) encircle launching sites of Soviet missiles speeding toward the United States; similar ovals on the North America map show computer-predicted impact points.

◀ THIS PAGE FOLDS OUT


U.S. AIR FORCE

Continued from page [illegible]

[illegible] the Atlantic and Pacific [illegible]

[illegible] ADC, told me about a most remarkable [illegible]

[illegible] radar, now under construction at Eglin Air Force Base, Florida [illegible]

[illegible] does not need to sweep back and forth [illegible]

[illegible] 360 degrees, can cover almost half the [illegible] simultaneously at such phenomenal distances as 2,500 miles.

[illegible]

NORAD's display boards show only significant figures. Sector headquarters identify and filter out most [illegible] the est material [illegible] commercial, military, and private flights that appear over the continent each [illegible]

During my visit to NORAD, I saw SAC's airborne command post, "Looking Glass," [illegible] on the map as a yellow symbol [illegible] middle of the United States. A small green [illegible] have flying in Rhode Island [illegible]

[illegible] NORAD sector headquarters verify all flight [illegible] [illegible] General Dwight D. Eisenhower [illegible] stragglers. Turn them back! They are [illegible] mysterious orange symbol [illegible] out to be [illegible]

As I watched, three unknowns [illegible] quickly disappeared. Along [illegible] arrows from the unknowns [illegible] the commercial ones. Then [illegible] turned back, and [illegible] from the war.

As for the other stragglers, [illegible] found that it was a commercial [illegible] navigation trouble, and it was "erase-

Electronic intelligence [illegible]

[illegible] plane's electronic stack at SAC headquarters. Beneath the [illegible]

[illegible] Bering Strait [illegible] at the Aleutian Air [illegible] [illegible] Warning [illegible] work with the Distant Early Warning [illegible] and the Eal[illegible] Mid-Canada Early Warning System. EMERY [illegible]

[illegible] NORAD helps bring com[illegible] planes back on [illegible]

A simulated attack by ICBMs flashed onto the board. Eclipses appeared on the [illegible] map, marking the [illegible] which missiles were flying at almost five miles a second. Computers whirred, making [illegible] calculations determining the exact speed, trajectory, and targets of the ballistic missiles and [illegible] amounts of [illegible] impact were recorded.

New eclipses—the targets of the simulated attack—appeared on the [illegible] map. They centered around Los Angeles, New York, Chicago, Detroit, and [illegible] to Springs, where I was [illegible]

[illegible] would have been flashed to NAC headquarters in Ottawa, to the Pentagon, and to [illegible] headquarters in Canada. One of the most amazing and foolproof [illegible] systems of evidence [illegible] by the Air Force Communications Service guarantees [illegible] current radar defense network. Even as I [illegible] a [illegible] [illegible]

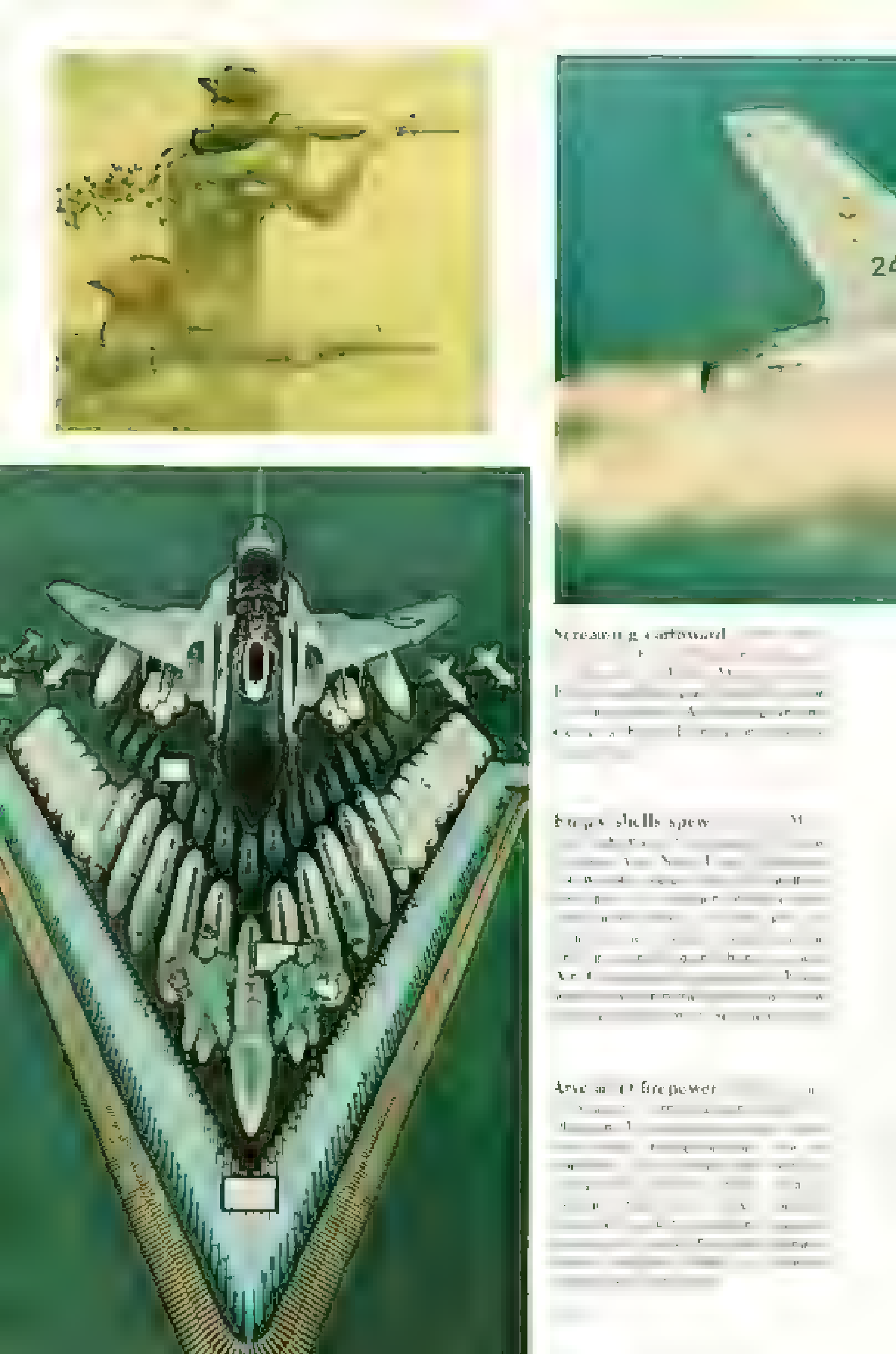
second [illegible] "Looking Glass" flying [illegible]

Because Colorado Springs would be a prime target, [illegible] year NORAD will move its Combat Operations Center deep into the heart of Cheyenne Mountain, a few miles south of the city. This [illegible] hardened against nuclear [illegible] has been under construction since [illegible] at a cost of $[illegible]

Sidewinder Aims at Hot Tailpipes

[illegible] Air Defense Command [illegible] prepares [illegible] sense of the most fantastic and so[illegible] [illegible] the entire Air Force. The [illegible] missiles [illegible] [illegible] marshaled on by the pilot. Most fast[illegible] [illegible] heat-seeking Sidewinder.

[illegible] watched a plane drop a para[illegible] flare [illegible] as it fell toward the ground, an interceptor two miles away loosed one of its slim [illegible] Sidewinders. A split second later the missile swerved toward the slow, swaying flare and unerringly bored in. A sudden flash, and the flare was no more.



[illegible]

[illegible] in front of [illegible] will cause the guidance fins to pop.

ADC's equipment has become so automatic that an ADC controller can launch a bat[illegible] of interceptor planes. A [illegible] has left the ground, the controller can take over from the pilot's [illegible] back-box magic known as SAGE, [illegible] Automatic Ground Environment [illegible]. With computers and a nationwide radar system, the SAGE centers move the planes to the enemy. They can [illegible] and return the [illegible].

[illegible] black boxes have taken over [illegible] of the [illegible] missed, rather sorrowfully.

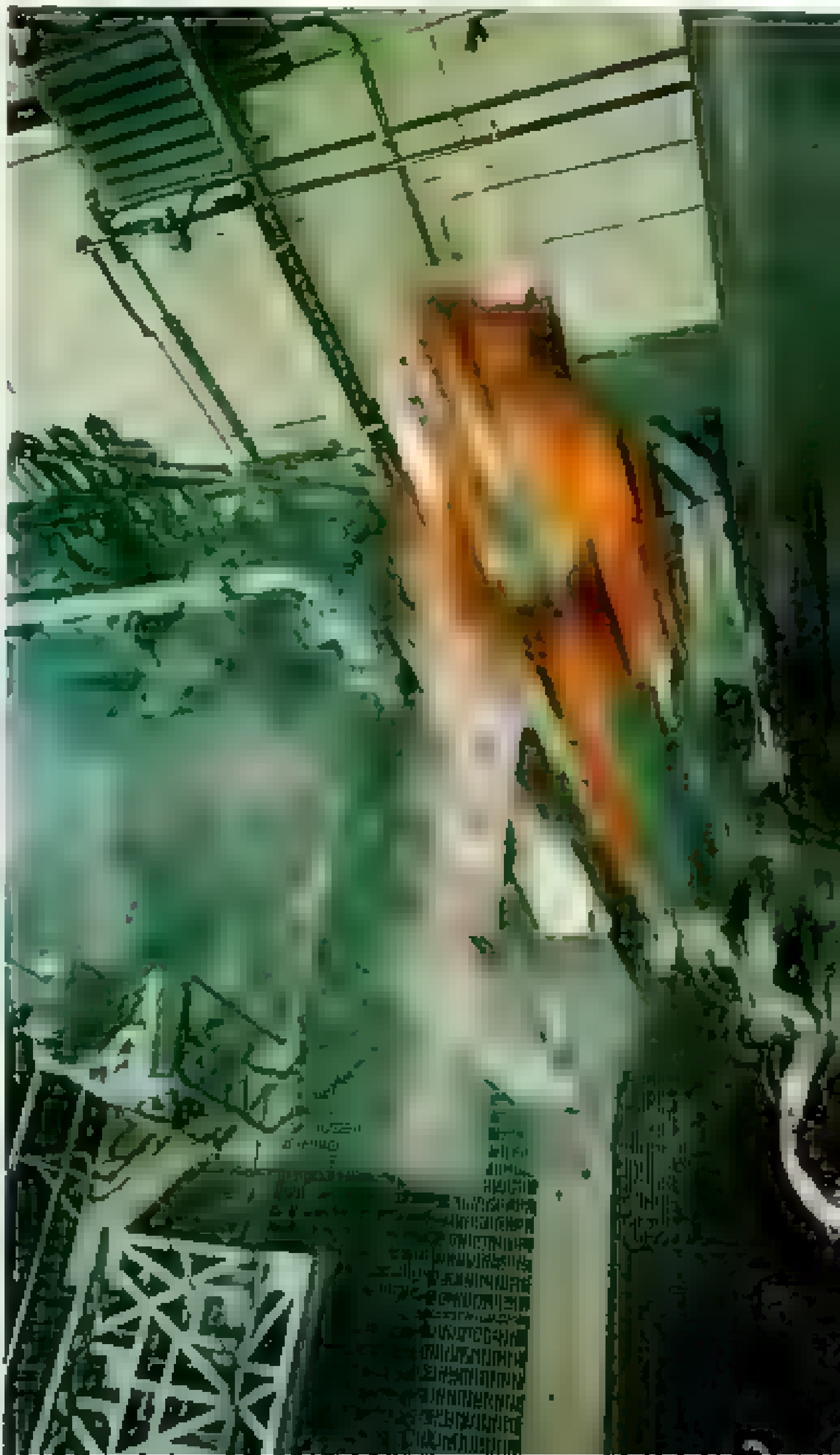
Mystery Plane Dashes a Dozen

A not-so-black mystery of a plane, the Lockheed YF-12A—YF stands for prototype—is the long-range interceptor of the future for ADC. Designed [illegible] secrecy, it was revealed [illegible] just a year ago, but it has been [illegible] a matter of mystery since.

[illegible] the YF-12A flew at Edwards Air Force [illegible] Mach 3 (about a few miles faster than the XB-70). [illegible] The XB-70 was [illegible] Mach 3 (about 2,000 miles an hour) for [illegible] minutes. The YF-12A, [illegible] about 1,800 miles an hour, [illegible] is to [illegible] its afterburners and disappear in an [illegible] cloud of sound and steam. Its afterburner jets fuel it to the hot-as-hell speeds to give extra thrust.

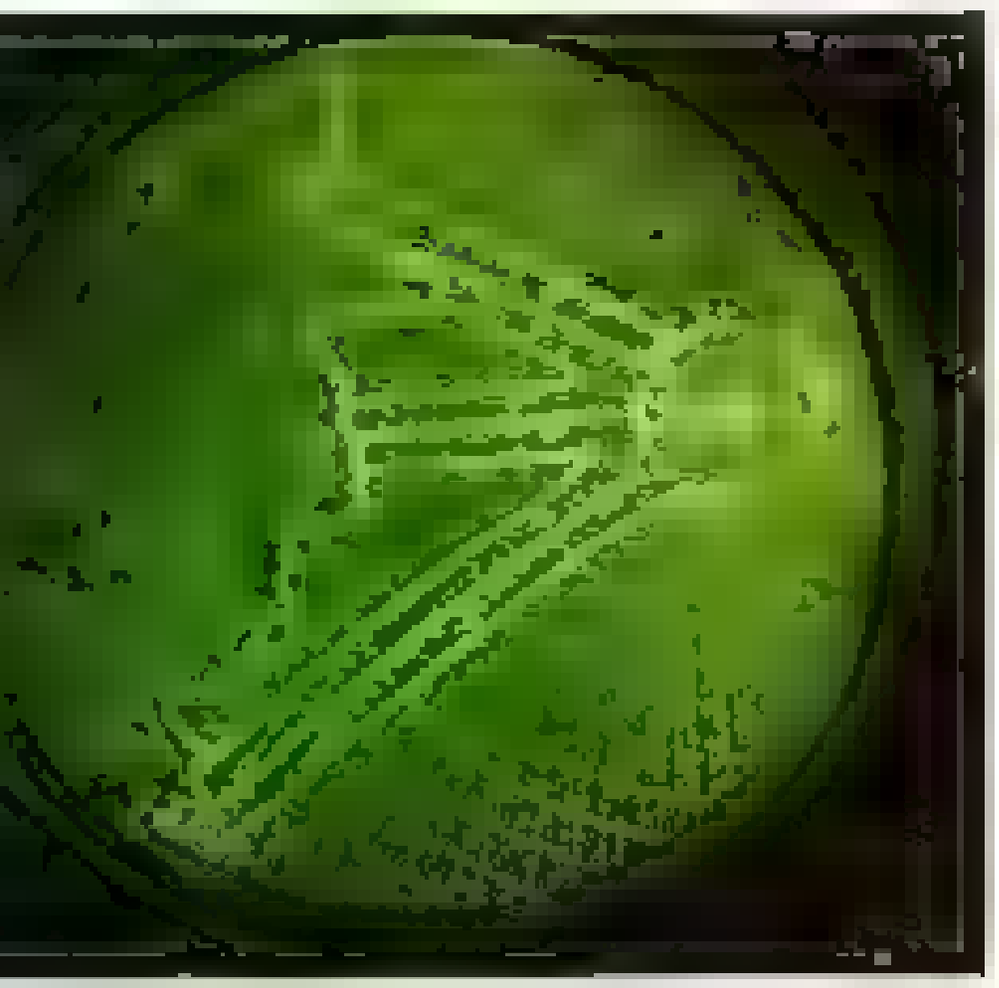
The YF-12A is the fastest ground-based plane ever [illegible] low-cost kerosene-powered X-15 [illegible] was at 4,104 miles an hour, but it must be launched high in the atmosphere [illegible] of titanium and other special heat-[illegible] materials. The YF-12A has flown [illegible] miles and [illegible] an hour for [illegible] minutes, [illegible] leaving [illegible] The Lockheed [illegible] at an altitude of 80,000 feet [illegible] every sense [illegible] breakthrough, as from its transonic beginning [illegible] to supersonic in two minutes.

Another mystery plane, the Lockheed SR-71, goes into operation late this year at Beale Air Force Base in California. Similar to the YF-12A, it heavier [illegible]



Scramble!

I



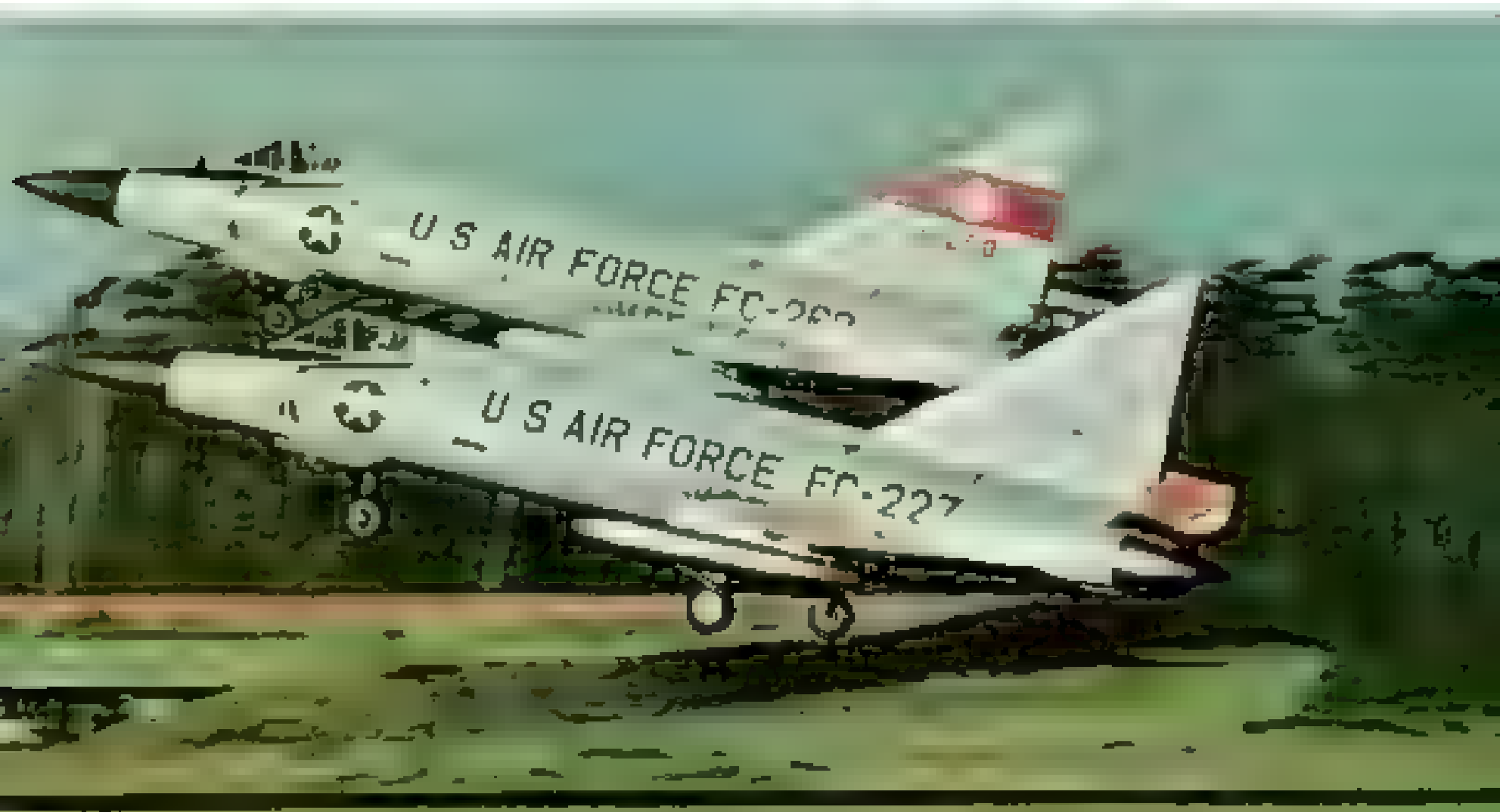
[illegible]

[illegible] some [illegible] effort at the [illegible] 11. To my surprise the [illegible]

[illegible]

Flightcrew Goes Both Fast and Slow

[illegible]



[illegible] have ended hem-
[illegible] I [illegible] paths
[illegible] Bussing across the target,
with bursts of fire bright enough the bulkheads
[illegible]

How I Learned to Weigh 500 Pounds

We [illegible] at 7000 feet and [illegible]
[illegible] second I [illegible]
[illegible]
change in air pressure. At 3000 feet I [illegible]
at the "pickle button." He let the red knob on
[illegible] that sent the bomb on its way. Then
[illegible]
when we turned toward again
[illegible]
crushing forces [illegible]
[illegible]
[illegible]
[illegible]
a fence to be hit on the fly by a bomb [illegible]
[illegible] the ground. In [illegible]
[illegible] miles an hour only 50 feet [illegible]
feet [illegible]
moved so fast [illegible] the blurred [illegible]
[illegible]
[illegible] the [illegible]
[illegible] the unpleasant splash [illegible]
[illegible]

I turned from skip bombing to escort [illegible] reporting to Homestead Air Force Base [illegible] A [illegible] rain squall whipped [illegible] I pulled on a heavy boot [illegible] underwear and a winter flying suit [illegible] for the sub-zero [illegible]

FAC Flies Northern Ocean

[illegible] warm clothing was necessary—I was going with the men of the 3[illegible]th Squadron [illegible] the 31st Tactical Fighter Wing on a [illegible] flight across the Atlantic to Çiçi, pronounced [illegible] Air Base near Izmir, Turkey. [illegible] they would stay for at least three months, replacing the 3[illegible]th Squadron that had finished its turn standing alert as part of USAFE, the United States Air Forces in Europe.

I was going in the back cockpit of an F-[illegible] [illegible] and the Air Force crew chief told [illegible] other cockpit water [illegible] over [illegible]

Saddlesore and weary, the author climbs out of the rear cockpit of an F-[illegible] after [illegible] hours of flying from Spain and Turkey. He accompanies the 3[illegible]th Tactical Fighter Squadron in flying from Homestead Air Force Base to Çiçi Air Base near Izmir, Turkey, where it became part of the United States Air Forces in Europe.

[illegible] practice flight [illegible] material [illegible] this article, he spent 220 hours in the air [illegible] most intensive Air Force [illegible]

Over the Atlantic [illegible] with a camera [illegible] a wing partner refueling from a KC-135 tanker. The weather [illegible] just above [illegible] most [illegible] on a [illegible] line [illegible] for the [illegible] based at [illegible] the [illegible] a [illegible]

[illegible] flight. The stories I had heard [illegible] the intensified pressure [illegible] would be stuck in our crampted cockpits for [illegible] years time [illegible]

It used to be [illegible] "Before fighting the press the first man in the air is the leader." But [illegible] this flight I had forgotten at least [illegible] before.

[illegible] earlier [illegible] the weather officer had said the weather was good. The operations officer had outlined the situation [illegible] over the water and [illegible] we reached Morgan Stanley, near Seville, where we would [illegible]

[illegible] search for [illegible] we would be back out. Each man carried flare [illegible] mirror, and a portable [illegible] or emergency [illegible]

Our flight number was four. Above [illegible] pilot was Capt. Steve Braswell, so one [illegible] the wing. He [illegible] Dallas to [illegible]

[illegible] the planes [illegible] were already running and with a whine [illegible] their jet [illegible] breath hot as in the face [illegible] launched over by the [illegible] pilots [illegible] I climbed into the cockpit and strapped myself in. Braswell [illegible] the safety [illegible] from the ejection seat so it could [illegible]

Four Planes Fly as One

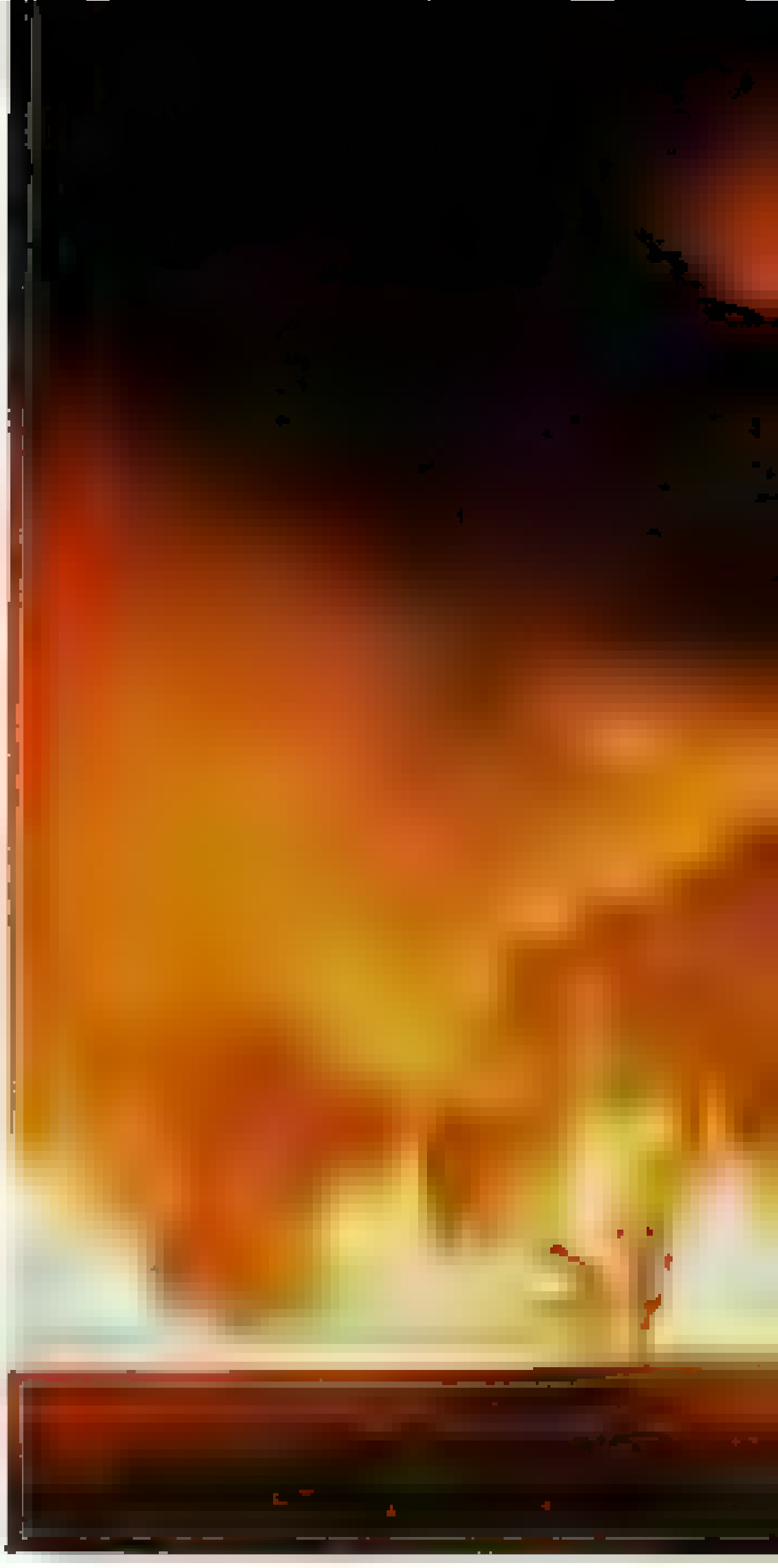
On the runway we took our place in the formation just to the right and slightly behind the squadron commander, Col. W. M. Sullivan. The canopy clanked down and locked with a [illegible] pressure in our [illegible]

Roll [illegible] the [illegible] the [illegible] moved as one.

Afterburner [illegible] 20 [illegible] from [illegible] the [illegible] of Sullivan's plane [illegible] and a violent blast [illegible] us. I felt [illegible] in the seat from our own afterburner [illegible] swallowed [illegible] We were on [illegible]

Unlike few [illegible] other two planes moved [illegible] perfect [illegible] from the ground [illegible] up landing gear and [illegible] off [illegible] at exactly the same [illegible] Our wings were no more than [illegible] feet [illegible]

As the air conditioner abruptly dropped the temperature of the warm, humid air [illegible] the cockpit. We [illegible]




U.S. AIR FORCE
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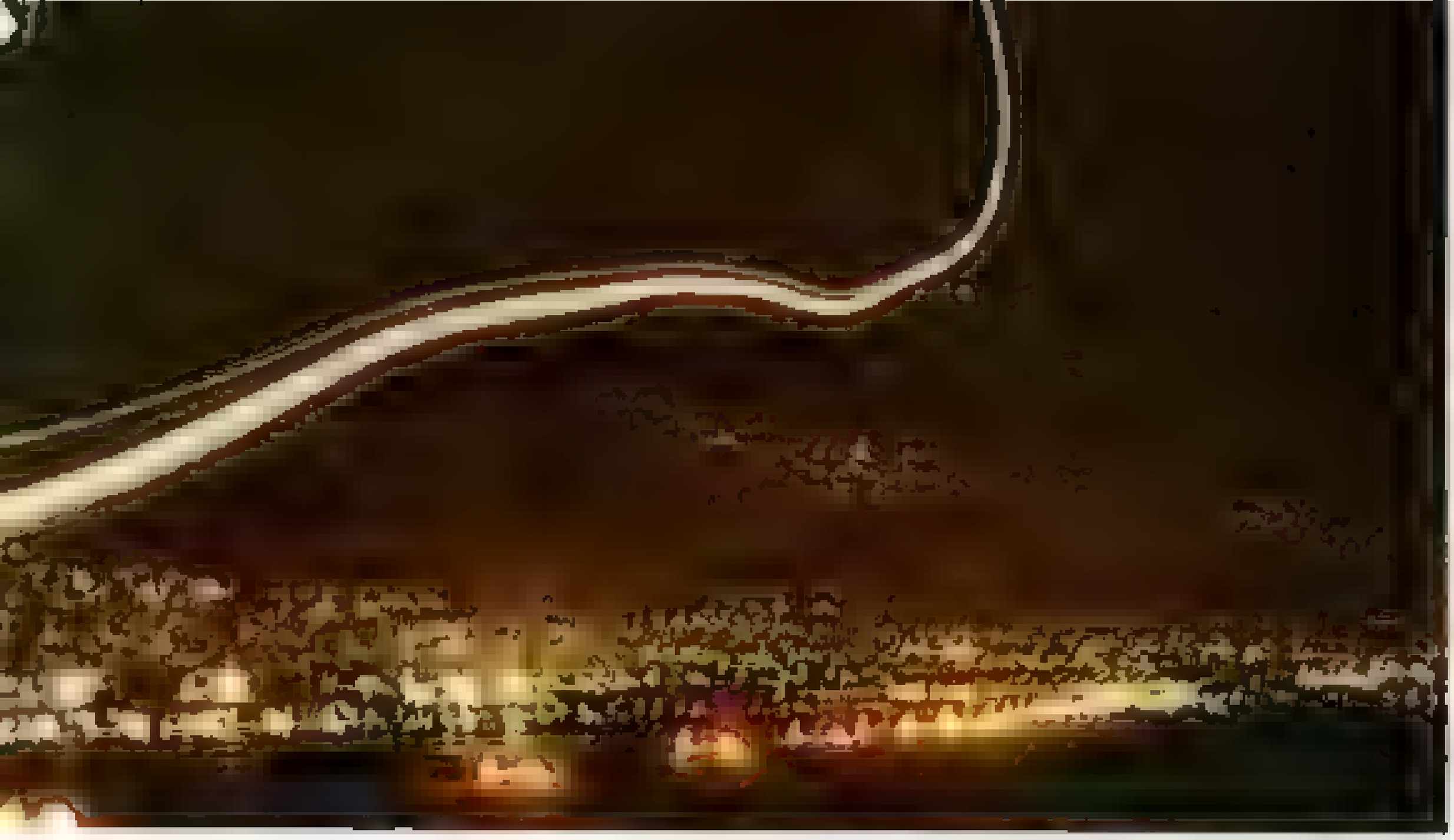



FORCE

[illegible] in Southeast Asia I saw warehouses [illegible] different items, an inventory worth more than $[illegible] Air Force bases in Texas I was shocked [illegible] Logistics Command because [illegible] enough [illegible]

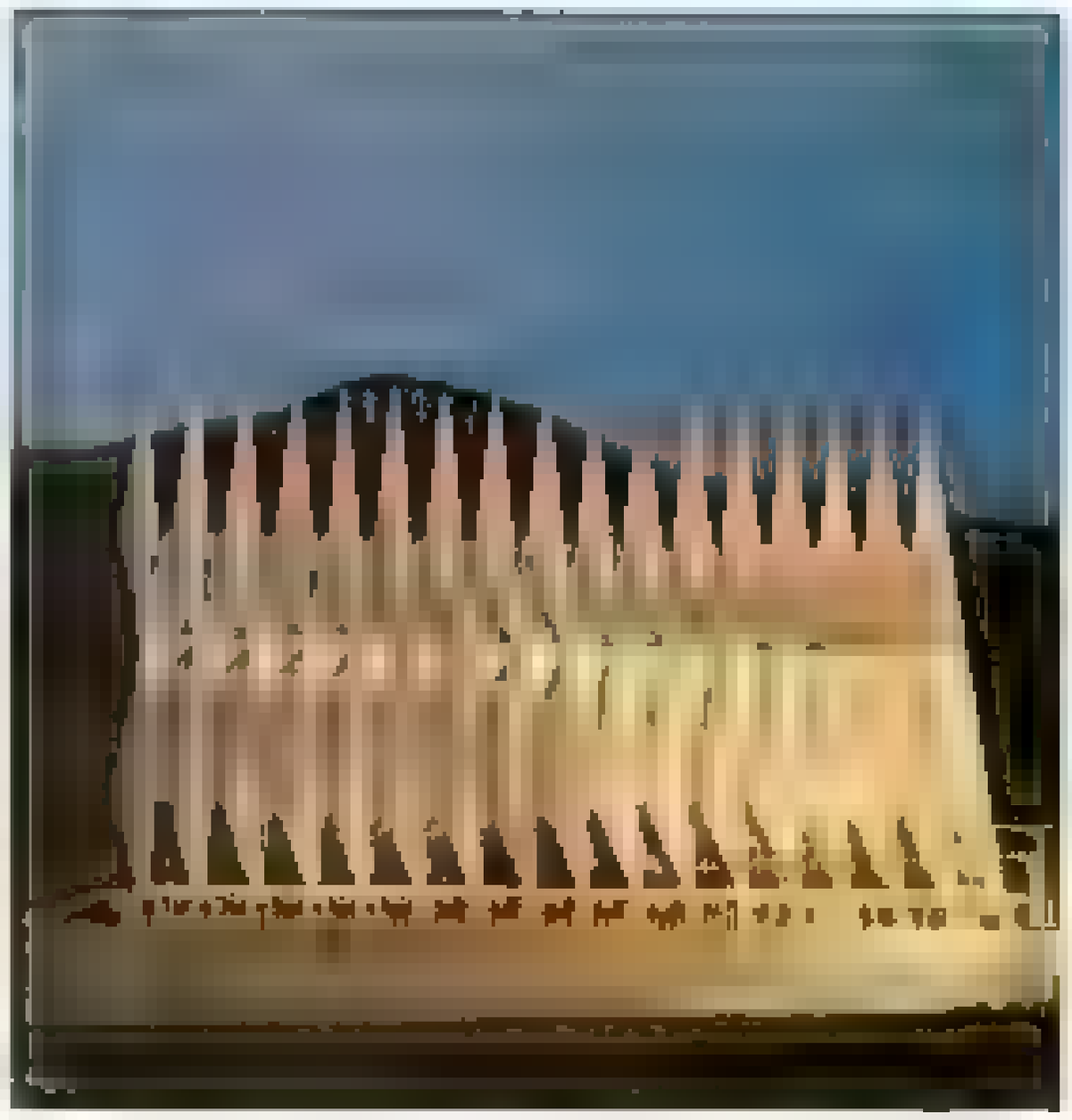
Add to these branches the Air [illegible] Guard and [illegible] are [illegible] by the nations, including maps of the moon. The Command Air Command, which [illegible] uses the Air Force Reserves and the Civil Air Patrol. The Security Service, which [illegible] and guards [illegible] installations. And the theater commands [illegible] Air Force, PACAF in the Pacific, [illegible] Command in Central and South America, and the Alaskan Command.

MATS: The Long-Haul Airline

Now [illegible] overlook [illegible] The Air Force transports [illegible] and research.

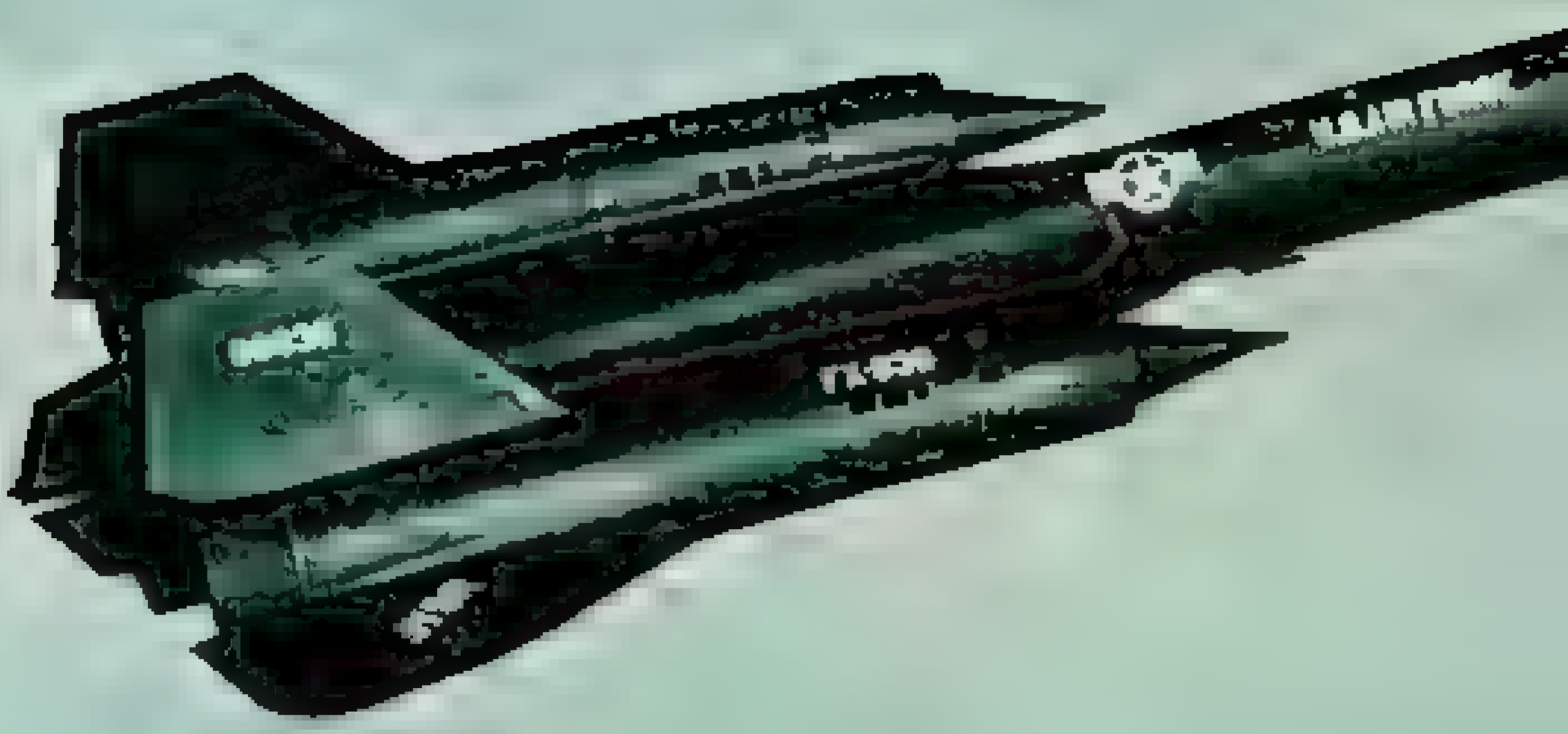
MATS, the Military Airlift Command, [illegible] the most [illegible] people [illegible] [illegible] MATS [illegible] [illegible] Upon the new plane will save [illegible] [illegible]

Repeatedly I ran into MATS specialists [illegible] and weather forecasting. Every flight [illegible] was accompanied by weather forecasts for the [illegible] MATS. At Wright-Patterson [illegible] forecasts are usually besides [illegible]



Converging tetrahedral spires [illegible] Air Force Academy [illegible] Colorado [illegible]

Soft floods of color [illegible]



USAF Secretaries Dr. Jim Mann Profiles

Black brute of a plane, the X-15 is the world's speed record holder. [illegible] and has a [illegible] record for [illegible] of flight at 300 feet. The SR-71, a new plane [illegible] to the X-15, goes into operation [illegible] which is a higher altitude reconnaissance craft.

flight tested at Edwards. It takes its entire wing and propeller assembly upward to lift straight off the ground.

Maj. Gen. Irvine L. Branch, commander at Edwards, told me that will [illegible] number near he expects more than a fourth of the workload at Edwards to be the testing of V/STOL craft.

Dedicated Men Ignore Hardships

Fantastic machines and [illegible] powered rockets, the mysteries of space—all these make life in the Air Force sound glamorous and exciting indeed.

But are these rewards enough, I often wondered, to keep a man in the service? Do they balance the hardships and outright dangers? Do they make up for the drudgery of long years at which most civilians would refuse? Do they compensate the men in TAC who may be away from home half the year and more? Or their wives who must stay behind wrestling alone with the problems of family and finances?

I sought answers to these questions wherever I went—sat in numerous officers' messes, in conversations during long flights, sitting in the homes of Air Force families.

The answers do not come easily. Men of action are not always given to introspection and they are often embarrassed to talk of a mission or dedication. But there is a pattern to the responses. Perhaps it is better than most of us. Air Force men and wives understand the threat to the peace. They know, as General LeMay points out in his introduction, that the way to peace lies in strength, and they mean to maintain that strength.

One officer who gave up a [illegible] to come back to the Air Force spoke of the deep satisfaction in what he is now doing, of his sense of [illegible] to his country.

Another said: "More than ever before in my life I feel I'm accomplishing something worthwhile. I may be a little cog, but I'm turning a lot of big wheels down the line."

And an airman put it in the simplest of terms: "I feel like I'm protecting Uncle Sam."

You may call it what you will, but I call it up to patriotism.

THE END

The Alps

MAN'S OWN MOUNTAINS

By RALPH GRAY

[illegible]

Photographs by WALTER MEAYERS EDWARDS

[illegible]

and WILLIAM EPPRIDGE

I [illegible] tering peak appears [illegible] to sky [illegible] dazzling [illegible] an Alpine village set in a [illegible] like the mountaineer at night. I am captivated by this world, the majest[illegible] Europe. But [illegible] asked [illegible] I have [illegible]

The [illegible] that soars [illegible] is western Europe's highest, 15,771-foot Mont Blanc. The village in the valley below: Chamonix, France. Close by, [illegible] ocean of perpetual snow [illegible] the Vallée Blanche. Hundreds of [illegible] the [illegible] the crisp air and warm sunshine.

We—my family and I—[illegible] the Aiguille du Midi [illegible] of the Mont Blanc Massif, a [illegible] gateway to Europe. [illegible] with many [illegible] Alpine highways, now bring tens of thousands of visitors each year to the high reaches of the Alps. For the peaks no longer belong only to the climbers, the rugged Alpinists who first tamed them.

[illegible] Blanc was one of the first conquered, climbed in 1786 by [illegible] and Jacques Balmat, both of Chamonix. And just a hundred years ago, on July 14, 1865, another [illegible] the Matterhorn [illegible] Englishman, Edward Whymper. Now, in 1965, the "Year of the Alps" [illegible] by Switzerland to commemorate the centennial of Whymper [illegible] and mountain [illegible] as we viewed the Alpine panorama from the Aiguille du Midi [illegible] climbers were at work, accepting the [illegible] through the snow. We later learned that two men [illegible] themselves [illegible] on the challenging heights. The previous year, [illegible] climbers perished in the French A[illegible]

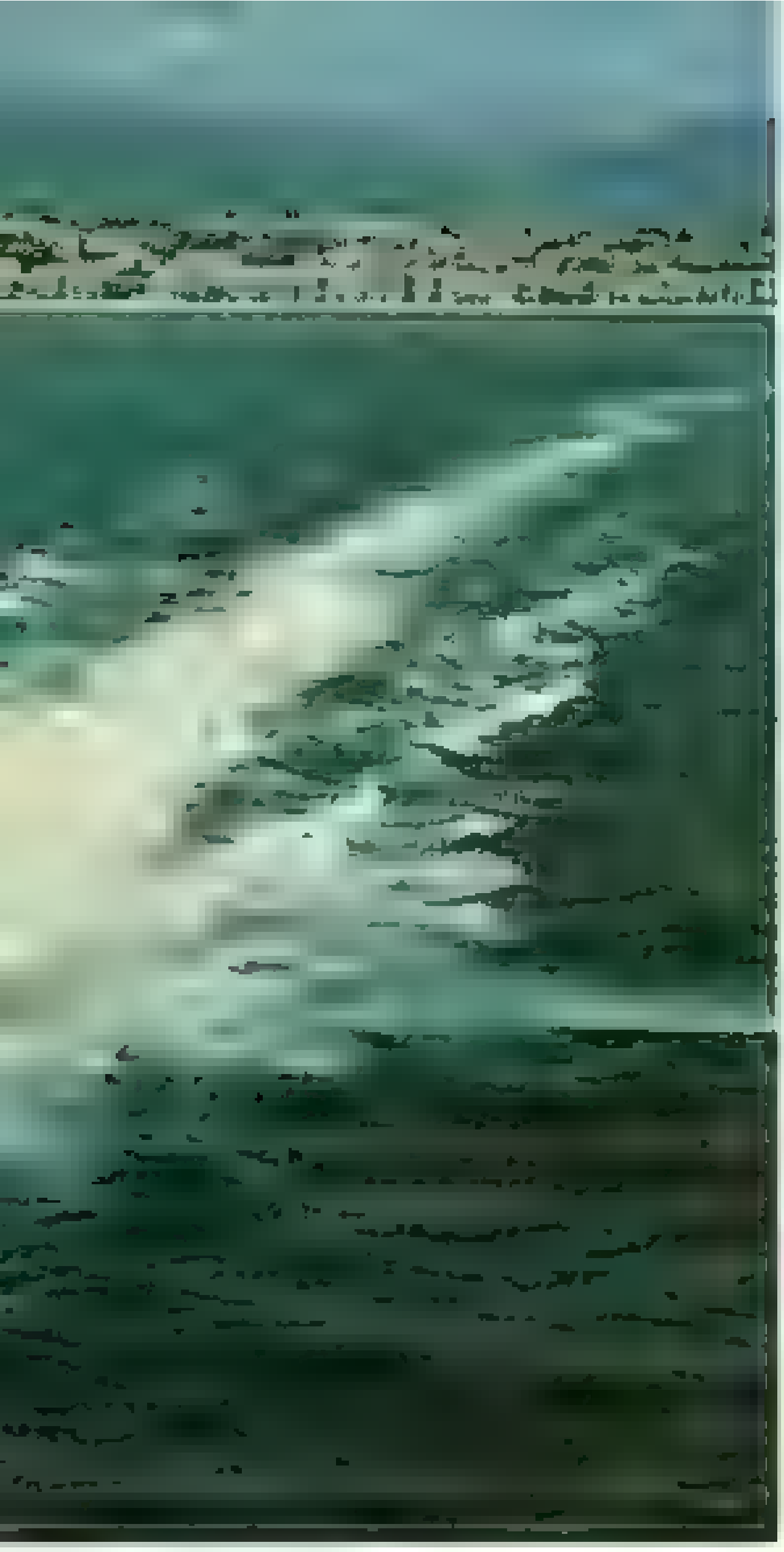
"Why don't you [illegible]?" I asked André Contamine, [illegible]

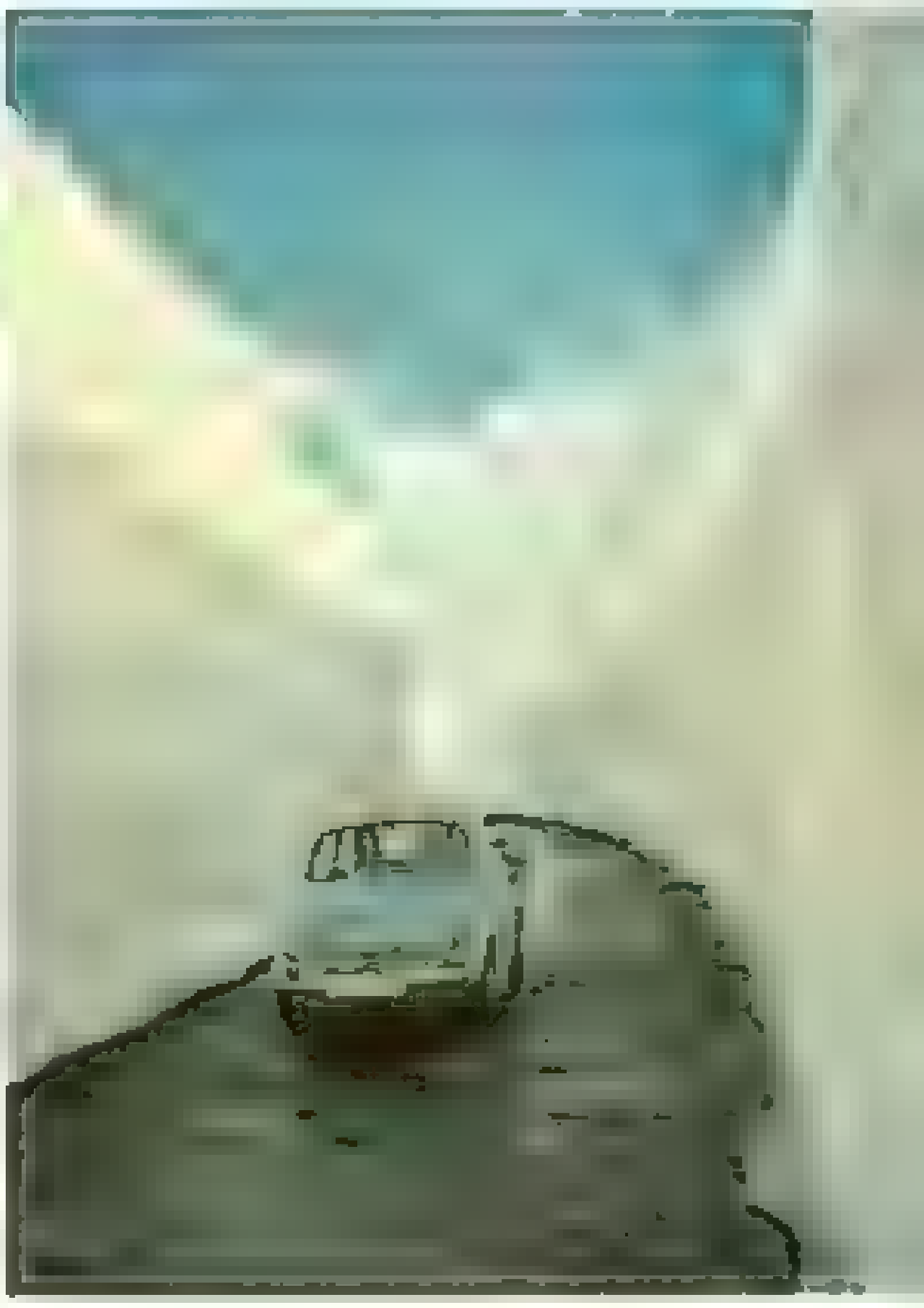
"You don't know the French," he replied. "Restraints or warnings [illegible]

Like a spider on gossamer threads, a [illegible] high above [illegible] Massif [illegible] of western Europe [illegible] alone, the many-faceted Alps [illegible] peaks and [illegible] to the author and his family during a three-month tour.

Mediterranean Sea

Switzerland, Austria, and Northern Italy





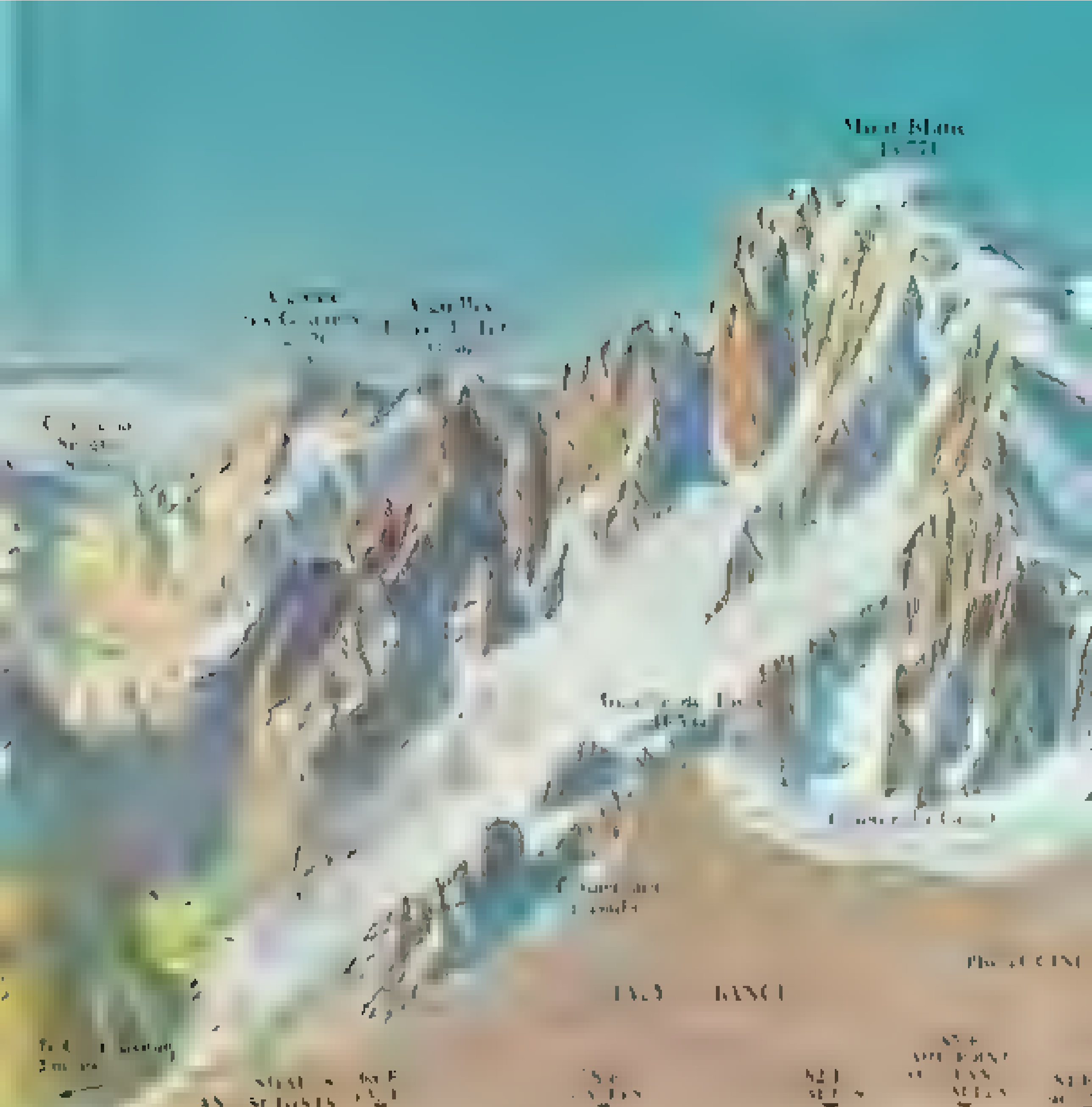
[illegible]

[illegible] and their modest supplies [illegible] were follow the old pressed [illegible] pound-down [illegible] all I [illegible] es Grandes. [illegible]

[illegible] We were [illegible] Europe [illegible]

[illegible] the Italian side. We [illegible] the border crossing [illegible] French, Italian [illegible] all the [illegible] the Alpine [illegible] gathered [illegible]

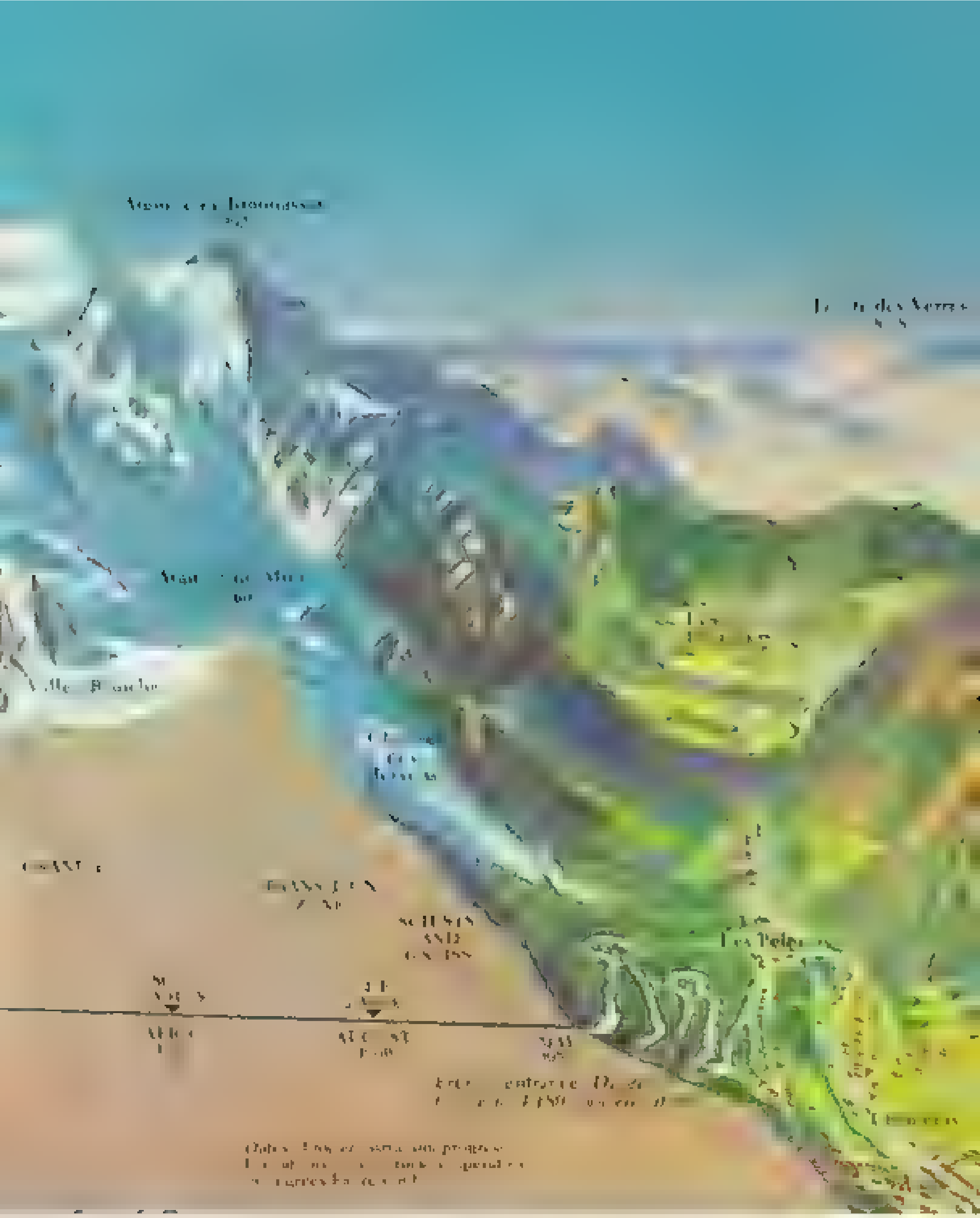
[illegible] pies began settling in Alpine valleys [illegible]



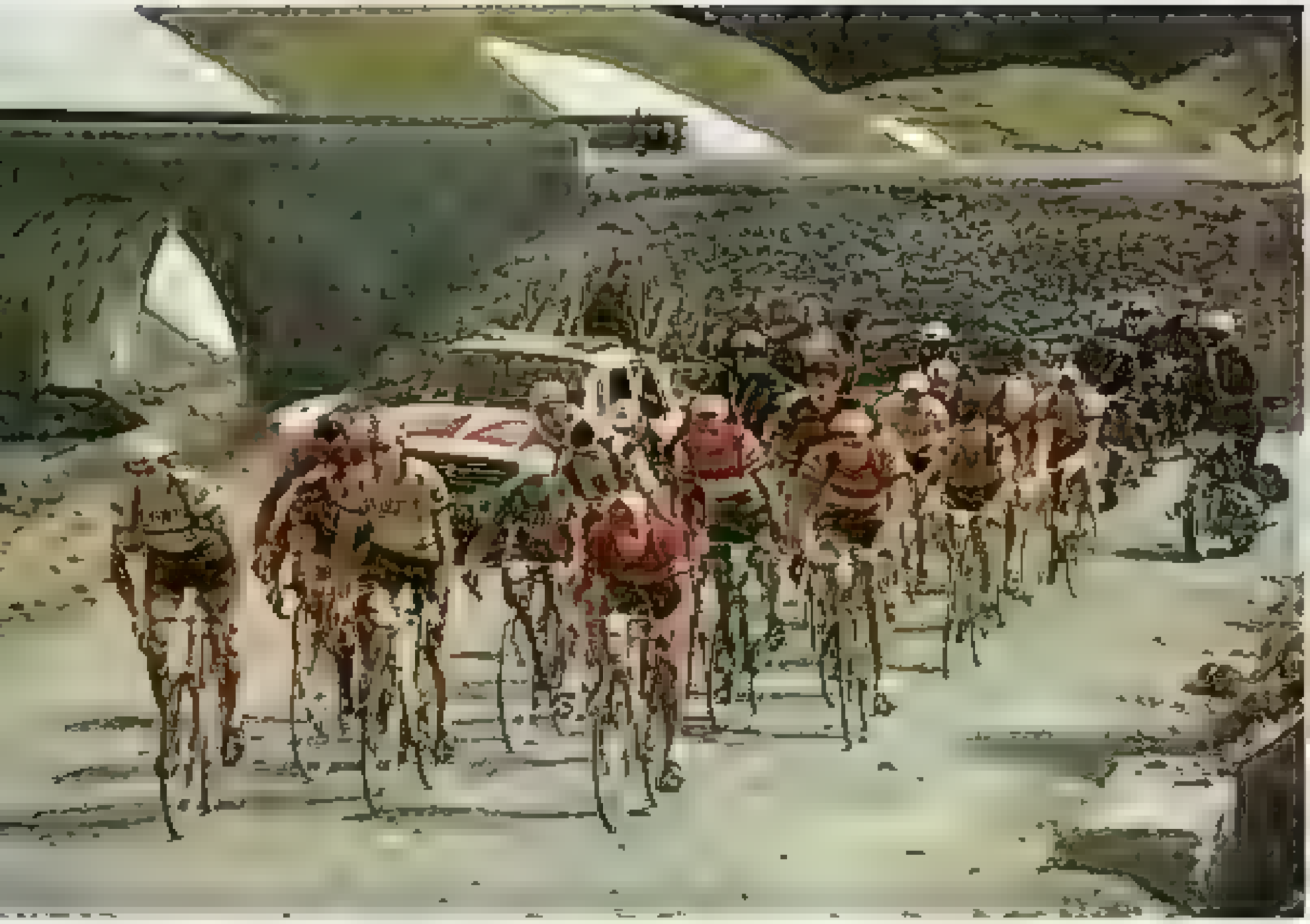
Mont Blanc

WITH TUNNEL IN PROFILE

W



[illegible]



[illegible] to them *mons* meant both pass and mountain.

Early settlers and the no-nonsense Romans ignored the peaks. These are an interesting [illegible], which uses both "alp" and "mont" to refer to the heights.

But the Romans left their mark. At La Turbie, our Volkswagen Microbus climbed the skyline high above Monte Carlo to the Trophy of Augustus—called also the Trophy of the Alps [illegible] monument [illegible] 6 B.C. Here among [illegible] Augustus crossed the Alps and, finishing [illegible] started by Julius Caesar, subjugated the Alpine tribes—46 of them [illegible] ing to the trophy [illegible].

Even in ruins, the trophy, once faced with [illegible] pilaster, rises 115 feet. It once [illegible] one of the first and most [illegible] of the Alps [illegible]. Originally, a circular colonnade supported a [illegible] statue of Augustus flanked by captives, giving the monument a height of 164 feet.

After the Romans [illegible] the Alpine region, this pass became a highway through which Roman influence flowed into what is now France and Germany.

Hannibal's Route Remains a Mystery

Mr. Marden [illegible] as we pushed deeper and deeper into the Cottian Alps. Here in the shadow of snow-capped Monte Viso, Mr. Marden and I spent a day on foot trying to reach the Col de la Traversette. This pass, [illegible] feet high, near the source of the Po River, is believed by some historians to be the place where the Carthaginian general, Hannibal, crossed the Alps with his elephants in [illegible] to battle the surprised Roman armies.

We surmounted one grassy height after another [illegible] seemed as far away [illegible].

[illegible] that we were on the right [illegible] he said with a straight face.

There are differing theories [illegible] Hannibal's route. I thought of a comment ascribed to Mark Twain: "The researches of many antiquarians have already thrown much darkness on the subject, and it is probable, if they continue, that we shall soon know nothing at all."

But we were learning more and more about the Alps. Though old in man's history, these mountains are young in earth history. Forming as recently as 70 million years ago. Not long before that, the sky-rimming ridges—almost piling on top of one another—were mud on a sea bottom. At the University [illegible] Grenoble I saw a [illegible] fossil sea shells—some of them [illegible] across—that had been found in the Alps.

As intense weathering pressure [illegible] the soft deposits [illegible] stone and crumpled them upward, ammonites and all. Then earth's eroding forces relaxed, leaving the 80,000-square-mile region of soaring peaks and great glaciers, icy lakes and green valleys.

An area that has invited man to settle, challenged invaders to cross, and today counts its visitors by the thousands [illegible] we were climbing [illegible] way to the [illegible] Alps—Col du Lautaret, Col du Galibier, and finally Col de l'Iseran, 9,088 feet, the highest Alpine highway pass.

Haying means fun for [illegible] Swiss [illegible]. Farmers harvest the steepest slopes, [illegible] winter food for animals that must be [illegible] in barns and sheds.

[illegible] Tour de France [illegible] over the black [illegible] of Europe [illegible] becomes a national hero.

Next to the Giro, the Tour de France is *plus important* — how you say — the most, the greatest," our timekeeper told us. "It is like our World Series."

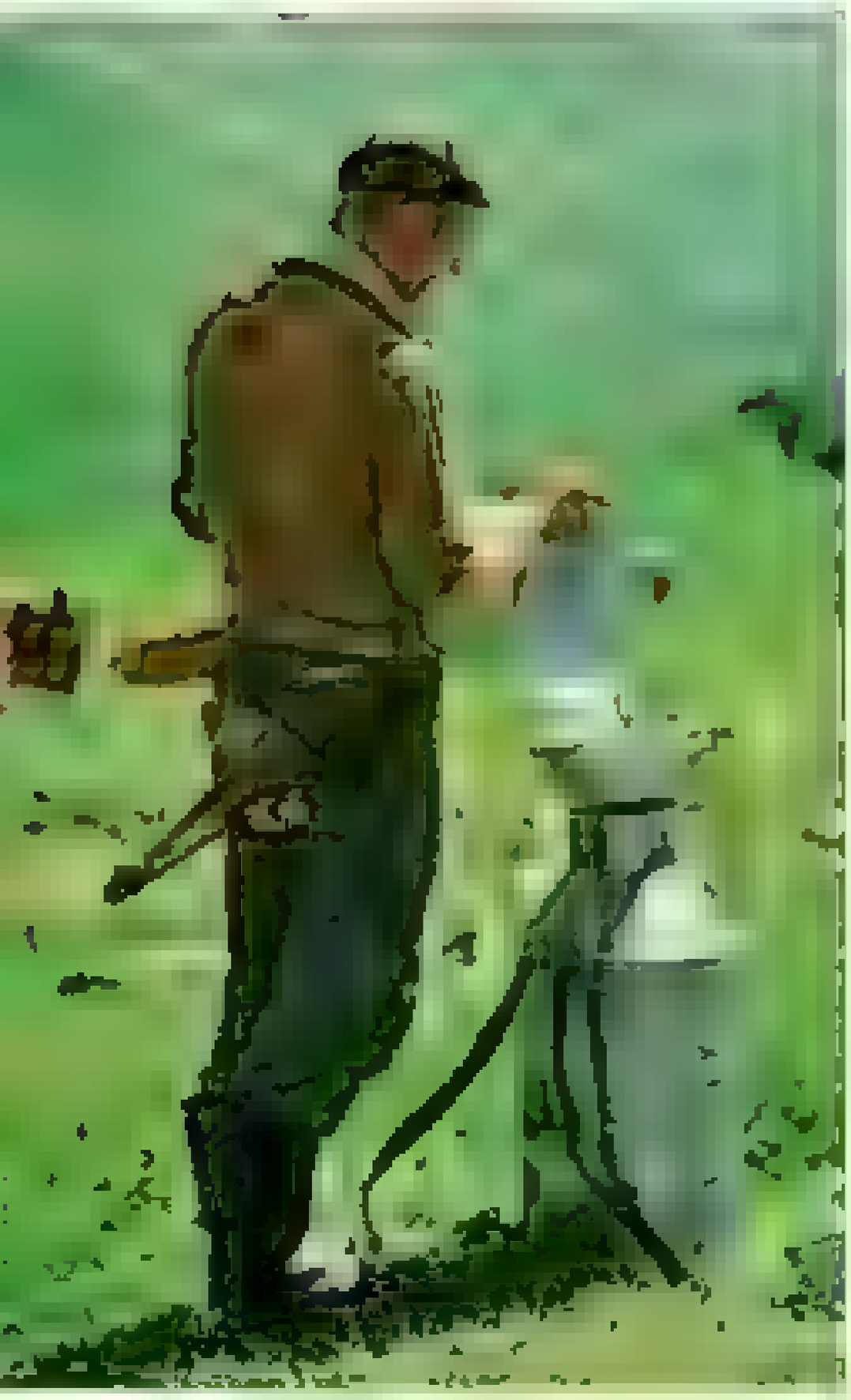
We arrived early, but all men in the best of the cyclists were not [illegible] the Col de l'Iseran already w[illegible] morning breakfast. On a narrow ledge between [illegible] way and the above [illegible] cluster of [illegible] Geneva where it was the morning [illegible]

[illegible] Alpine [illegible] to a stream [illegible]

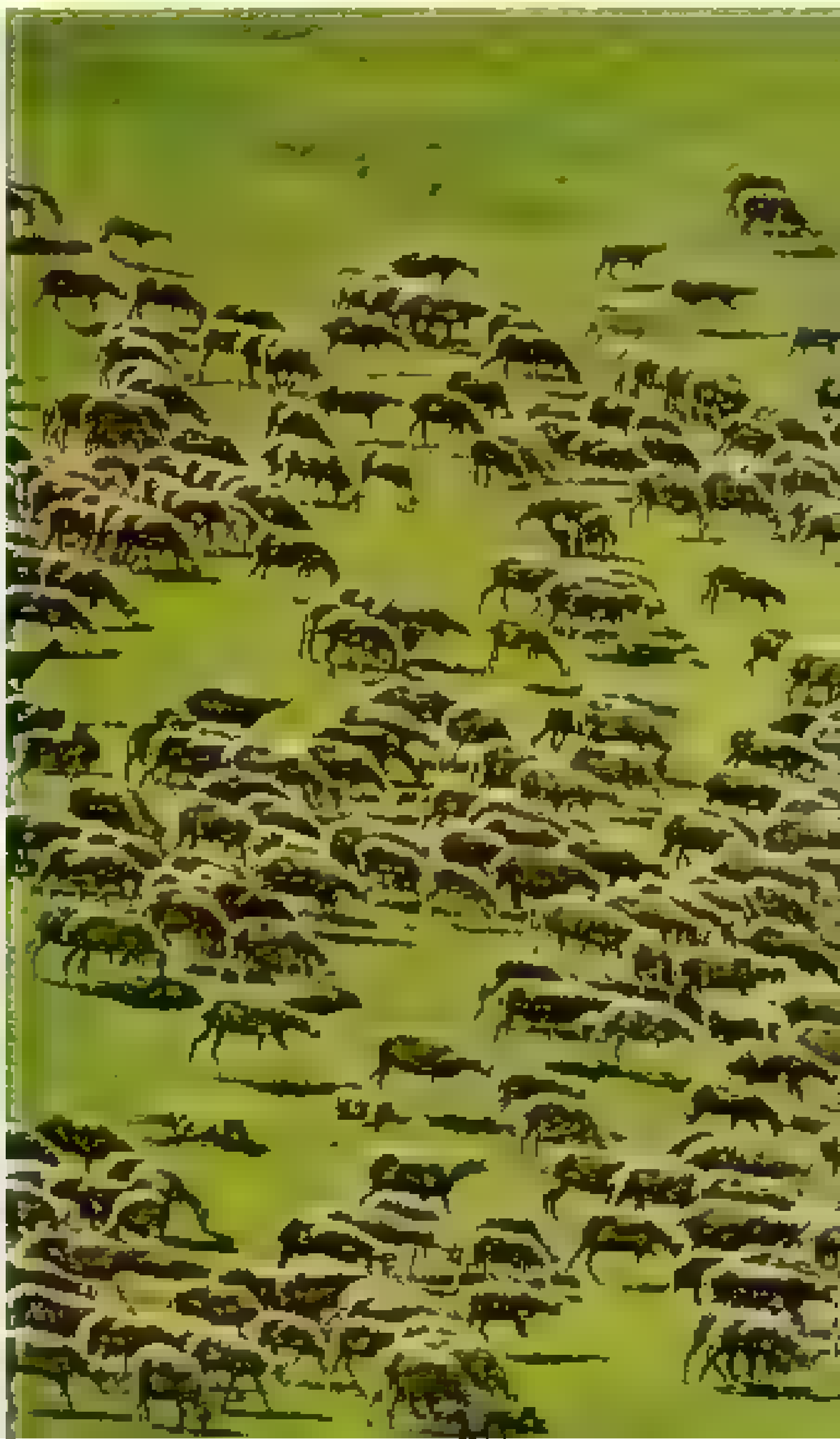
A caravan of [illegible] lines of spectators, lines, and sportsmen passed [illegible] as well as [illegible] came by, [illegible] the crowd from the [illegible]

Finally, [illegible] together in a pack. They were [illegible]

[illegible] to the [illegible] so many [illegible] engulfed [illegible] power. The strain [illegible]



Hard-hugged steel [illegible]



Mark Twain Climbed the Easy Wa

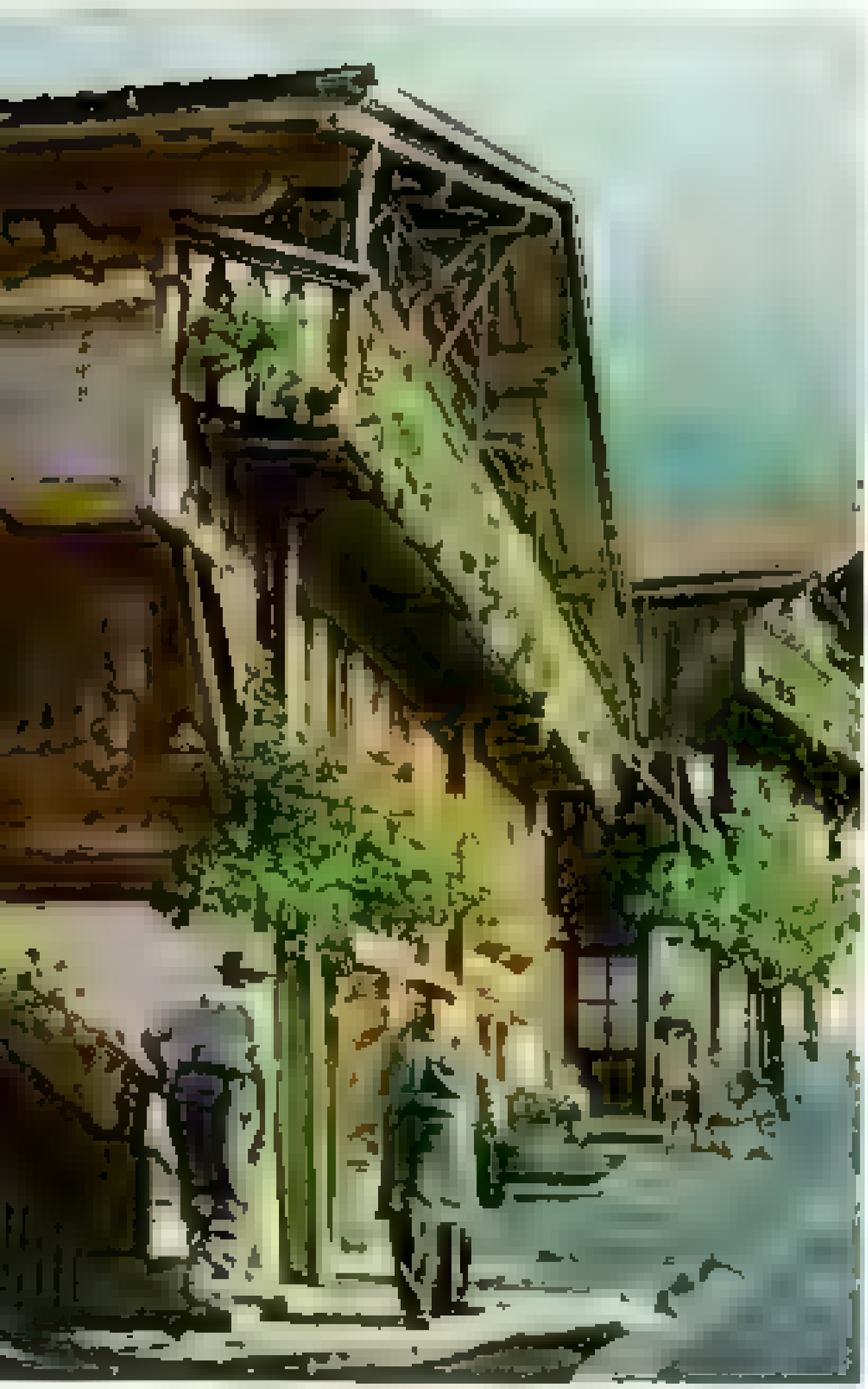
[illegible]

[illegible]

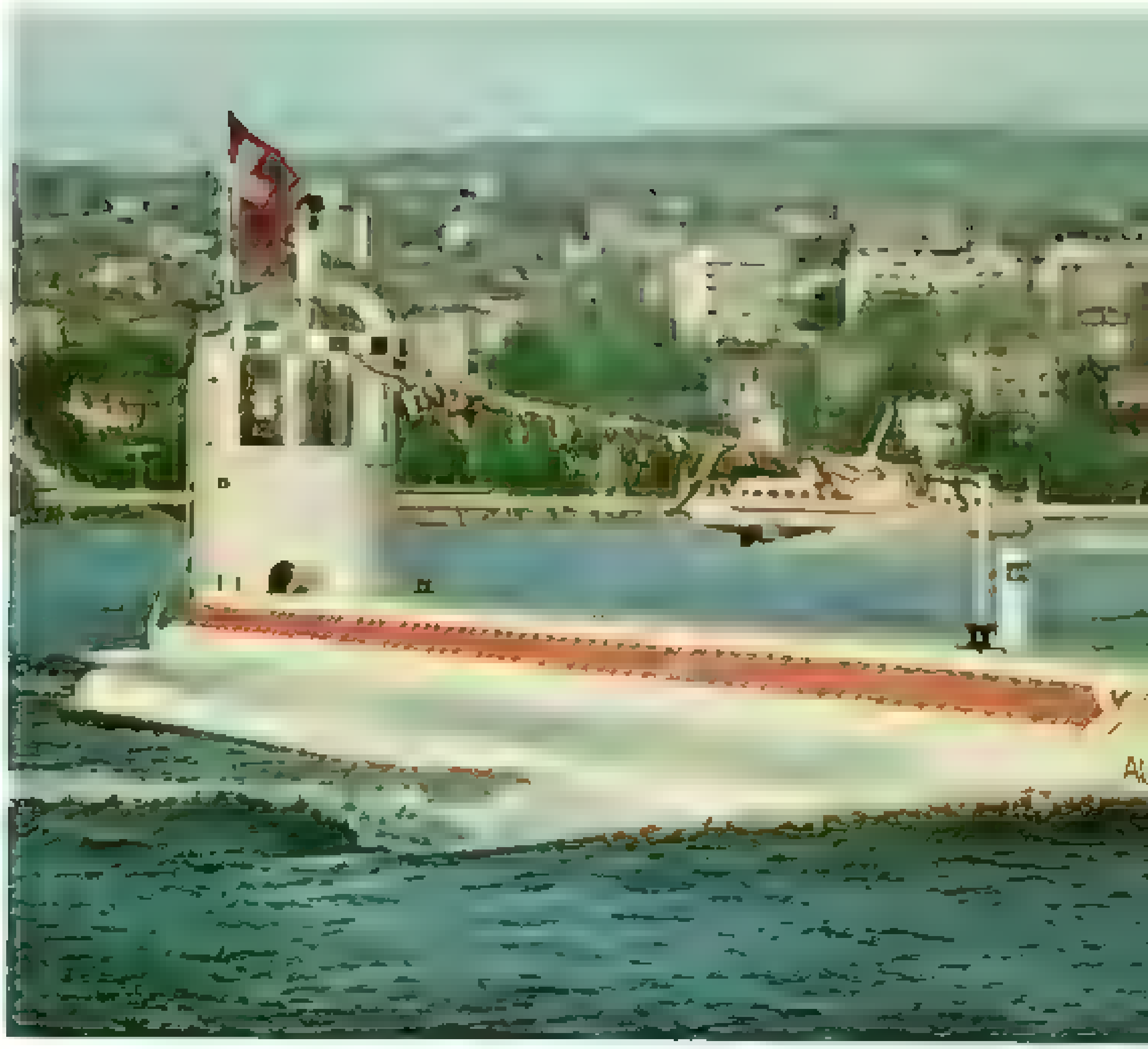
[illegible]

Mark Twain's *Tramp Abroad* [illegible]

Mount Elbure Ruched by Aquaragwa

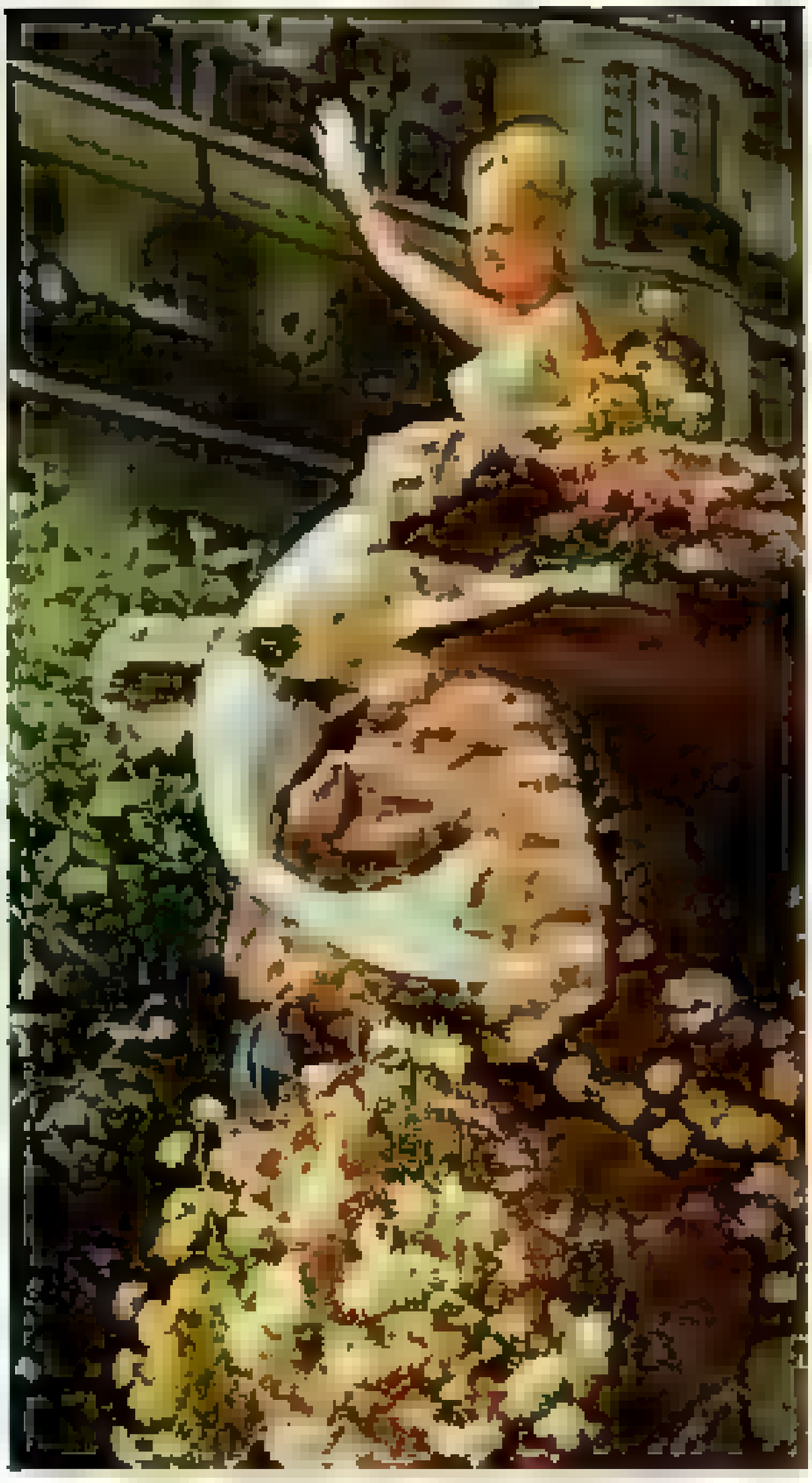


St. Louis Planters in New Harmony



Mountain Climbers Flock to Zermatt

At Visp we turned our cars



In other words as many as 37 persons have called the Matterhorn in one day. There [illegible] hard rock, with a permanent rope rail [illegible] rough hard stretch.

Traffic is a problem, someone said [illegible]

[illegible] "Don't Chief

[illegible]

[illegible]

[illegible] who accompanied [illegible]

TV Meet Tau[illegible] followed the struggles of his 135 cute pieces of the Matterhorn. [illegible] that photographs [illegible] on his knee [illegible] cubes with [illegible] around [illegible]

[illegible] Tauro[illegible] Once a storm came up. Snow on [illegible] a 65-year-old English lady. He [illegible] yes. I cut it off so she [illegible]

In [illegible]

We talked about Whumper's crew. It was a strangely mixed group: Wanderer Jane, princess Douglas and his cousins the Peter Brewsters, and three Lost Angels refugees [illegible] actually exist.

[illegible]

Whumper and the Taugwachers were the as [illegible] Their feet were firmly [illegible]

Dusk drops a canopy over Lucania [illegible] axe and the enchanted Mac Lach [illegible] of Monte Sp[illegible] [illegible] Lake L[illegible] [illegible] leave [illegible] trees [illegible] the [illegible]


WALLISERKANNE
hotel

[illegible] Man's Own Mountains

[illegible]

We wanted to see [illegible] pass. He turned downstairs [illegible] the engine and took a Taffer [illegible] a few yards I looked [illegible] and saw two [illegible] in the snow—tracks left by [illegible] the [illegible] immense

Zermatt Bells Chime Quarter Hours

Now we flew along the Italian front of the [illegible] where clouds were lurking [illegible] we knew why Geneva had [illegible] take-off. Through a gray haze we glimpsed [illegible] and sky. I was on the Plateau Rose. [illegible] we [illegible] Switzer and the Matterhorn [illegible] half [illegible]

[illegible] we once again stepped the [illegible] trails and peaks. Though no automobiles [illegible] pedestrian bazaars arise from [illegible] horse-drawn [illegible]

A flock [illegible] goats, each wearing a [illegible] jingled under our window each dawn. The [illegible]

Five-Hilling Backdrop for a Lofty Repast Matchless Matterhorn Snags a Cloud

[illegible] Alps [illegible]

[illegible]

On the Great Steps of the Alps

[illegible]

[illegible] Engelhorn [illegible]

[illegible] Man-made [illegible] through the electric [illegible]

[illegible] are [illegible] the Alps. [illegible] of the Jungfrau. The [illegible] peak. This remarkable railway [illegible] from Interlaken to Jungfraujoch [illegible]

A pine snowbird, pun H

[illegible]

Helicopters rep ace m ales i

[illegible]

[illegible] stands at a [illegible] feet on a 2 [illegible] the summit of the Lang [illegible] the Mönch. The [illegible] road is from 4 [illegible] took 14 years to [illegible]

Leaving a Jungfraubahn stop at the Eigerwand outlook we had to turn, we gazed down the fearsome North Face of the Eiger—the Cliffe [illegible] but perpendicular and formed of crumbly stone. Its [illegible] prey [illegible] and sometimes killed [illegible] the elite of mountaineers since 1935, when its conquest was first attempted.

[illegible] the great particularly of Tom Kurz who died of exhaustion in 1936 while dangling just beyond help—not far above the very window. The North Face has claimed 24 other brave young men, but they keep coming. In 1961 a Swiss guide, Michel Darbellay, made the first solo ascent. Two others who made solo attempts before him died, and a third gave up.

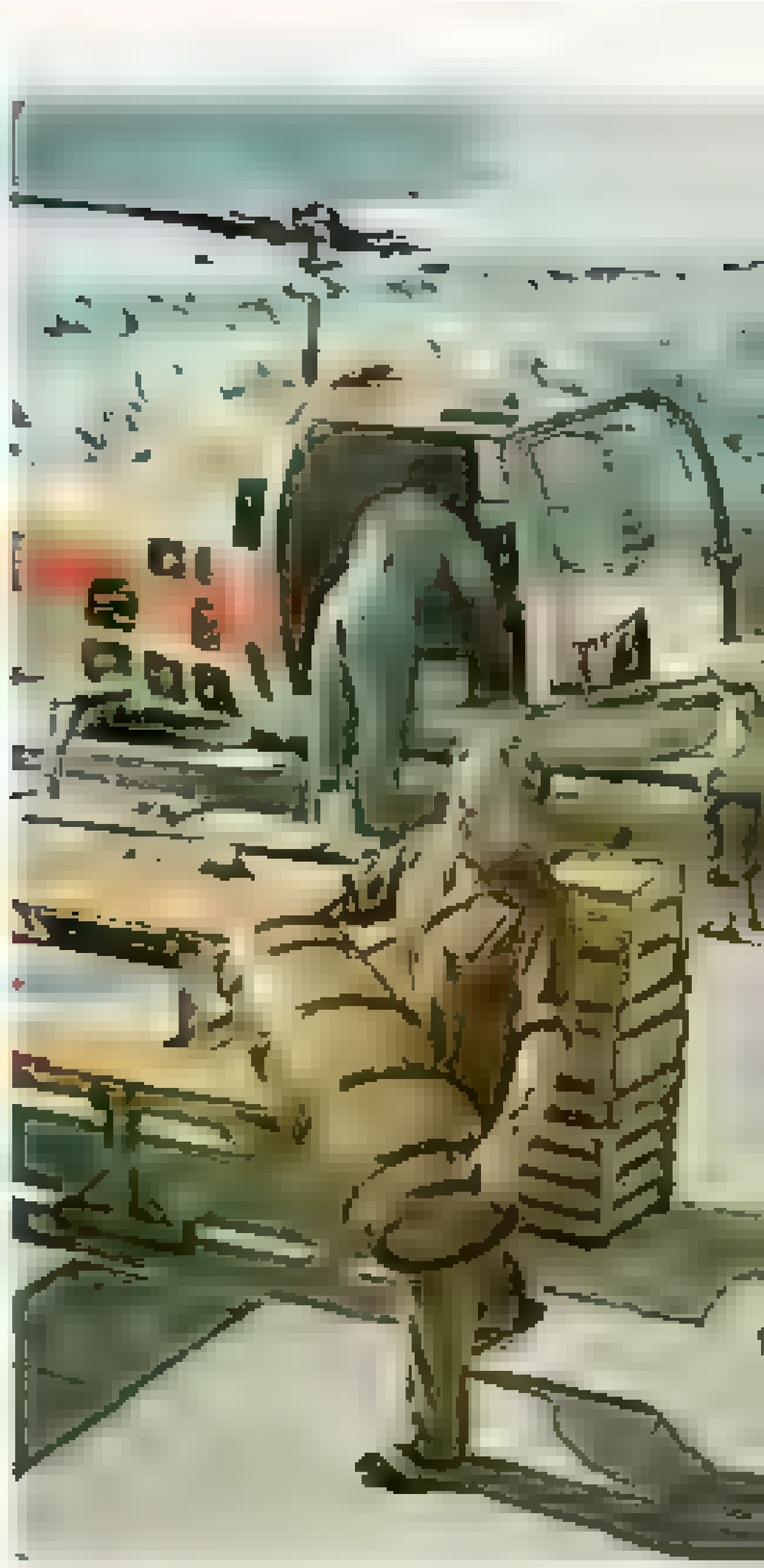
A 300-foot elevator ascent from Jungfraujoch brought us to a golden plaque [illegible] a [illegible] lined the walls. To the south [illegible] the Jungfraujoch, northern end of the Aletsch [illegible] observed three [illegible] the Jungfrau. Joe [illegible] of the [illegible] yellow billed [illegible] silenced by the roar of a massive [illegible] of ice breaking loose [illegible] Mönch [illegible] snow slopes in a spectacular avalanche.

Down Vis to Her Last Rest

My [illegible] been [illegible] Lake [illegible] on a private expedition. From our headquarters in Interlaken we drove to Grindelwald where a cable car [illegible] brought the climbers to what seemed like a green flying carpet in the sk[illegible]

We walked to the edge of the meadow where clouds were [illegible] over the [illegible] and looked down. This was a place pronounced "fearsome" [illegible] grassland [illegible] that breaks [illegible] a sudden escarpment [illegible] a dense fog. It seemed that one could step, [illegible] be of shock before hitting the bottom.

A helicopter suddenly appeared over the [illegible] as it was applying the



[illegible] mountain [illegible]

[illegible] note tha[illegible]

[illegible] and ask

[illegible] crafts [illegible]

[illegible] master of their sol[illegible] masonry homes [illegible] and where people make the ma[illegible] Lages look like examples [illegible] an art gallery. An[illegible] [illegible] in Romansh, the fourth offica[illegible] Swiss language. For German, French and Italian, Ladin the [illegible] [illegible] than 5 million Swiss, mostly in the [illegible] spoken by 5 million Swiss, mostly in the

[illegible] with. An[illegible]

[illegible] n old Romansh poem [illegible] w we fe[illegible] about our land." said [illegible] coming from [illegible] "It's called 'If the [illegible]

[illegible] tion, and its Rambo[illegible]

three languages: Letzerwasser, Tschenastel, Pasquale to Poschiavo and the neighboring [illegible] of La Punt Chamues-ch and Sochum [illegible] Long time we climbed the steep shelf above the River Inn to Guarda, which retains the look and pace of yesteryear so remarkably that people call it the museum village of Romansh land. The horse-and-buggy farmers who live here can pose a hand with German imperiousness when a tourist dares get in the way of their peasant charms. They [illegible] here at work in the basement.

A few miles away, at Samedan in the Upper Engadine, the versatile Alpsoffer what many consider Europe's finest [illegible] for the modern sport of sangalamag, pages 58-61. I took a spin in one of these graceful machines right with Jakob Kilchenstein, first I explained the dynamics.

The warm wind comes through Maloja Pass from Italy, lasting from about 11 a.m. to 4 or 5 p.m. nearly every day in summer and rages along the low mountains. The [illegible] up rails fast over and carrying you [illegible] another levels of vertigo.

Jakob strapped me in, gave a signal and the winch now pulled us high into the air [illegible] seconds. He cast loose and maneuvered for [illegible] I felt one wind exhausted with a [illegible] on Mt. Bernina. The low mountains we passed were [illegible] again and again and [illegible] a little higher and a little higher.

Gradually the winds became stronger and colder. The plane creaked and groaned. I [illegible] and roared like an express train. Suddenly we dropped [illegible]

"Well, try again," Jakob yelled [illegible]

"No, [illegible]" I pumped through [illegible]

white lips, and he apparently didn't hear [illegible]

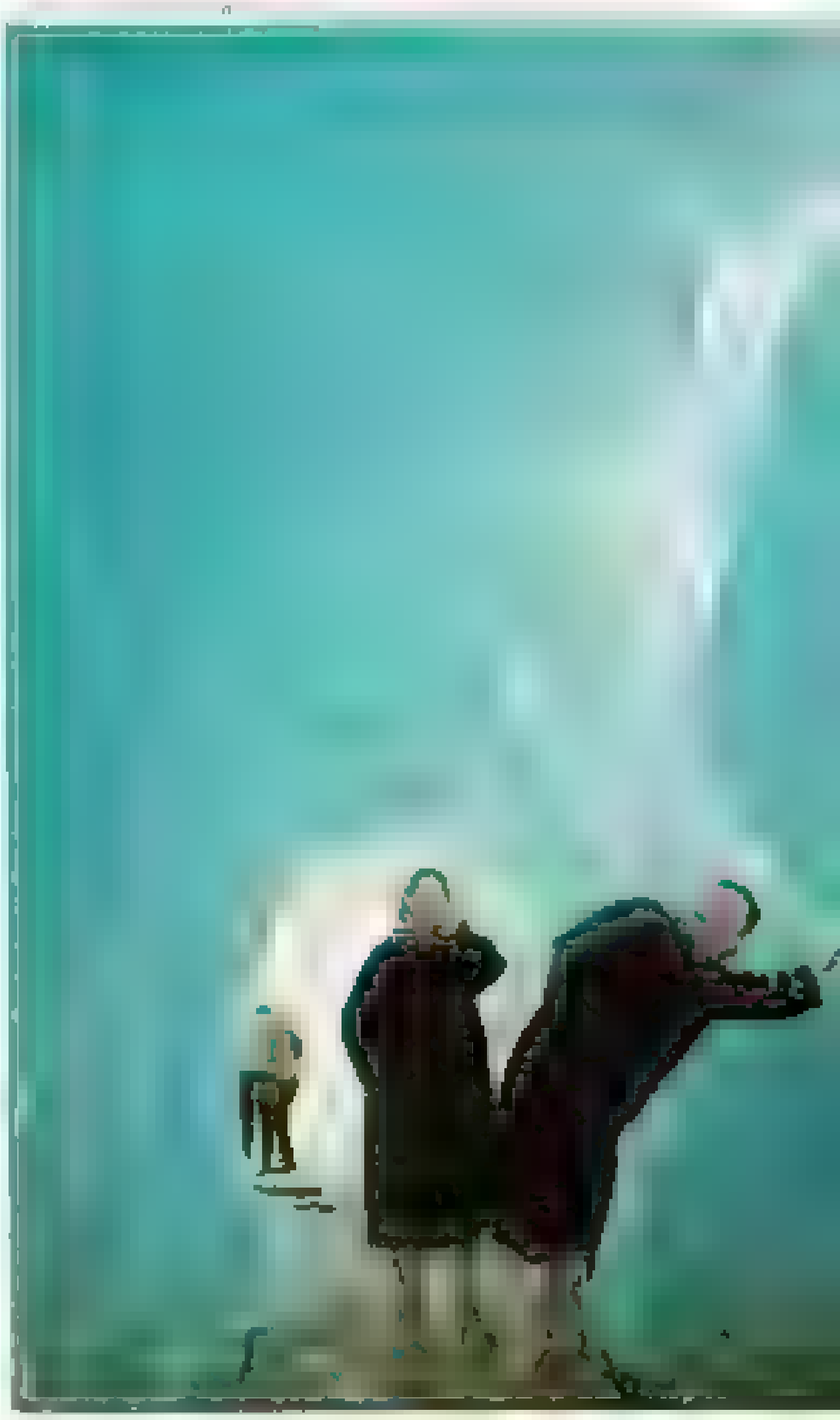
The terrified [illegible] got as over the invisible [illegible]

Then we easily sailed back above the snows and glaciers of the Bernina Alps. I reminded myself that my mother had gone up here—just up, we [illegible], at 1 a good price.

St. Moritz Stages a Fiery Celebration

Upward from the depth of this dark, [illegible] snowed a quiet evening in St. Moritz, [illegible] the Wasserfall presumably with its wide [illegible] [illegible] and along the [illegible] lakefront town we passed down on the renowned tobogganing of all summer and winter resorts.

Next barkeepers begged the Fast Platz and [illegible] the crooked streets, carving low and a curious branding tower—the only remaining fragment of the original village. Turrets and towers of elegant hotels rose beside the tall dotted lake. All around, peaks etched the sky



Foaming stairway of [illegible] Swiss [illegible] Area [illegible] creeps behind [illegible] the Bernina Alps. [illegible] River Inn [illegible] the [illegible] and finally [illegible] the [illegible] Danube-bound craft [illegible]

Blue and [illegible] the source of the Rhine [illegible] Parkin' Pass. Each spring a new [illegible] must be [illegible] snow [illegible]

[illegible] source of the Inn River

[illegible] Instead of the [illegible] insights we [illegible] buses, we land [illegible] and scenes—often [illegible] Under the [illegible] and flowered balconies every morning and evening pass a herd of large-horned cows on the way to and from surrounding pastures.

"They don't care what or who the traffic [illegible]," said George [illegible], president of the Lindt Tourist Association, as we pulled over to let the animals pass. "We call them the sacred cows of Garmisch. Not to [illegible] Hindu's cows, perhaps, but the beasts have the same right of way in the streets."

I [illegible] quickly wanted to show my children [illegible] castles of Ludwig II of Bavaria, a "Three called Ludwig the Mad King," said Baedeker, that as tourist attractions, his castles bring the state of Bavaria more than [illegible] a year.

Ludwig [illegible] ruled from 1864 until his death in 1886. A bachelor, he received few guests in his extravagant hideaways. He liked to sleep away the morning for breakfast at the evening. He would dine on truffle-stuffed [illegible] at 2 a.m., then have supper at sunrise before retiring.

Castles Reflect Builder's Genius

We visited two of Ludwig's castles, and came away convinced that some sort of genius madness not was at work in the building of Neuschwanstein, near Schwangau, and Linderhof, closer to Garmisch.

[illegible] with the wild, romantic operas of Richard Wagner, Ludwig started Neuschwanstein on a crag overlooking [illegible] like Lohengrin (page 332). He died before completing the grandiose structure.

The tour requires determination—not so much because of the many floors, long corridors, and endless chambers, but because one becomes exhausted by the Teutonic turbulence of the paintings everywhere depicting the hates, loves, and murders of the Tannhäuser, Lohengrin, Tristan, and Parsifal sagas.

Linderhof is a jewel box compared to Neuschwanstein. In the style of the Petit Trianon [illegible] it contains the late Baroque flamboyance of France, and was Ludwig's second retreat from the uncertain and political 19th century that he despised. Built between 1868 and 1878, Linderhof today is one of Germany's most visited sites (opposite).

The thirst of Germans for good plans is only whetted by their own Alps, and these people spill into Austria in vast numbers. No nation does a better job of welcoming out-siders, in Austria, in spite of the language

Dedication of Louis XIV. Ludwig's bedroom in his bachelor's [illegible] Linderhof Castle [illegible] a number of the Bavarian kings [illegible] treasures [illegible] Partenkirchen Crystal chandeliers [illegible] Versailles [illegible] Ludwig's castle in the style of Louis XIV's Petit Trianon, the royal hideaway [illegible] Pompadour [illegible] wore [illegible] costumes.

Gauntlet of spray keeps visitors dry in the grotto of the Neuschwanstein Castle near Schwangau. Ludwig [illegible] "A Bavarian water piece," the [illegible] [illegible] and wet surprises. [illegible] were concealed in [illegible] boxes.

barrier, we made travel so fast that I remember the country as much for them as for its [illegible] and [illegible].

On the rare occasion in Innsbruck when I found myself at loose ends, I walked at night along the inky River Inn flowing silently but swiftly between its man-made walls. I visualized the crossing in Roman times, the building of the first bridge—*Brücke*—in the 12th century, and overland commerce flowing through here between [illegible] fields and the broad valley of the Po River.

Our route soon was eastward. Kitzbühel, full of German visitors, gave way to the high country of Lungau. Here the storybook towns of Tamsweg, Mariapfarr, and Mauterndorf retain the look of old Austria, and here I saw the picturesque Samson [illegible].

"The *Samsonumzuge* are very "folk oriented,"" Herr Dr. Werner [illegible] of the State Tourist Department had told us in Salzburg. "No one knows how old they are, or what they really mean."

We arrived at [illegible] in time to [illegible] helpers lower a giant effigy, clad in a blue tunic, from a tavern to the shoulders of the [illegible] man in town (page 588). The tunic enveloped the man, and the figure above took on a life of its own. To me, "Samson" looked more like a Crusader or a conquistador than the Biblical character. He carried a lance and [illegible] a sword, armor, and a helmet.

Two comical barrel-shaped dwarfs, a [illegible] man and woman, accompanied Samson. The red-vested village band led the way. In front of every inn Samson stopped and danced, as the band played, and the proprietor came out with wine and beer. He lifted the skirts of each figure and gave drink to the men inside.

'Krott-cola' Washes Down *Jagerrost*

South of [illegible] the land rises toward a range of the Alps called the Niedere Tauern, and here, near [illegible], we found the Peter Krott family, one of Austria's most unusual.

Dr. and Mrs. Krott and their boys Max and Martin had lived in the Italian Alps with two brown bears named Bumsi and Sepha for two years while making scientific observations on the animals' habits and physiology.

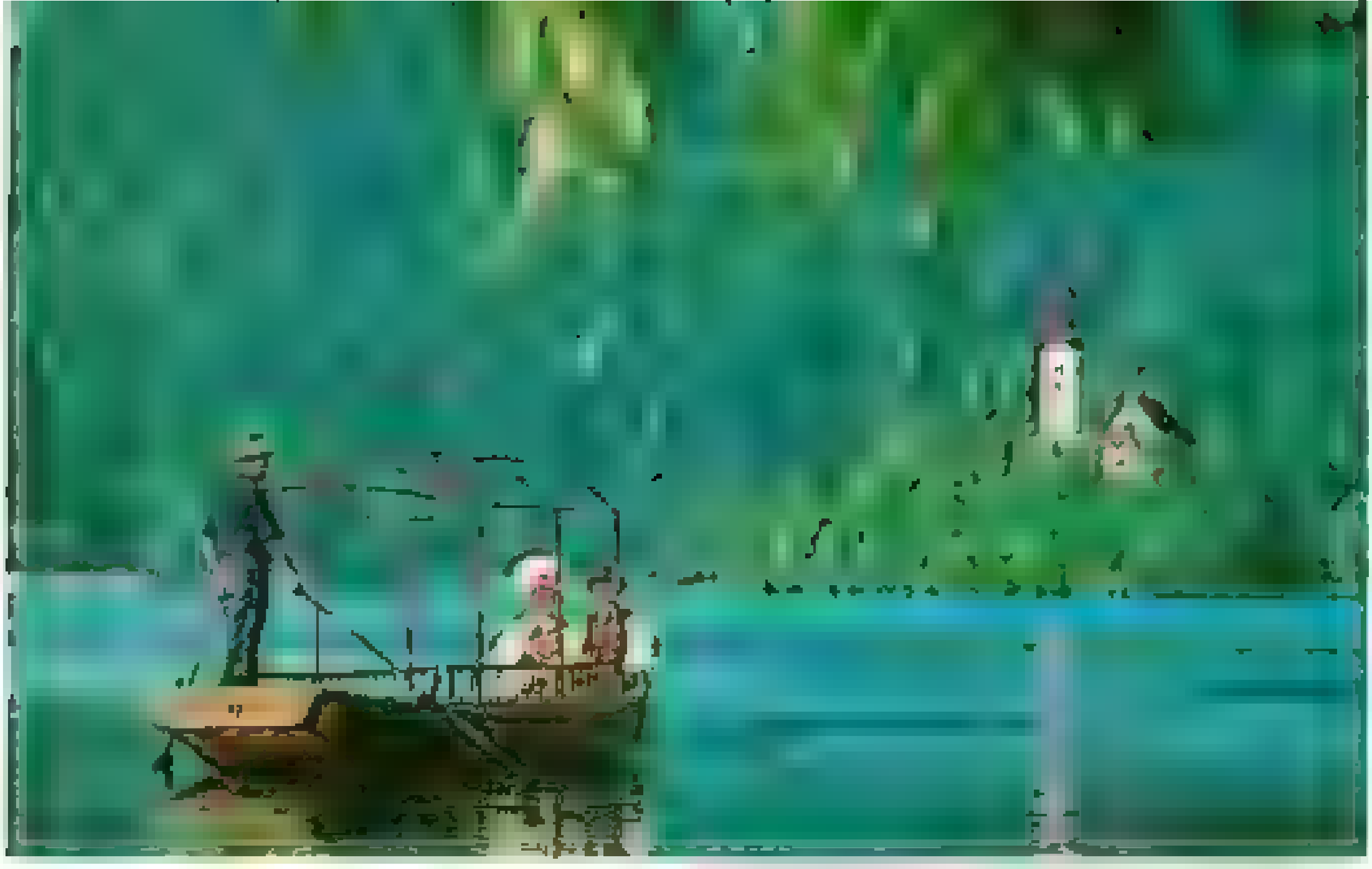
Peter Krott acquired the bears when they were infants and bottle-fed them until old enough to forage for themselves. But even when freed to roam, Bumsi and Sepha stayed with their foster parents. The cubs—with no knowledge of a father—regarded both Dr. Krott and his wife as their mother.

Bears, the Krotts learned, will always be

Circling earthward, sailplane of Jakob [illegible] prepares to land at [illegible] Airport in the [illegible], where warm southern winds [illegible] of [illegible] hold the motorless craft above [illegible] the [illegible] Alps.

Towed by a powered plane, a wide-winged sailplane climbs from a meadow in Austria's [illegible] region. In the distance, a towering [illegible] above the clouds.

Sailplaners get their initial lift either from a motor plane or from a winch that hurls them skyward. Pilots maneuver skillfully in a series of circles to gain altitude.

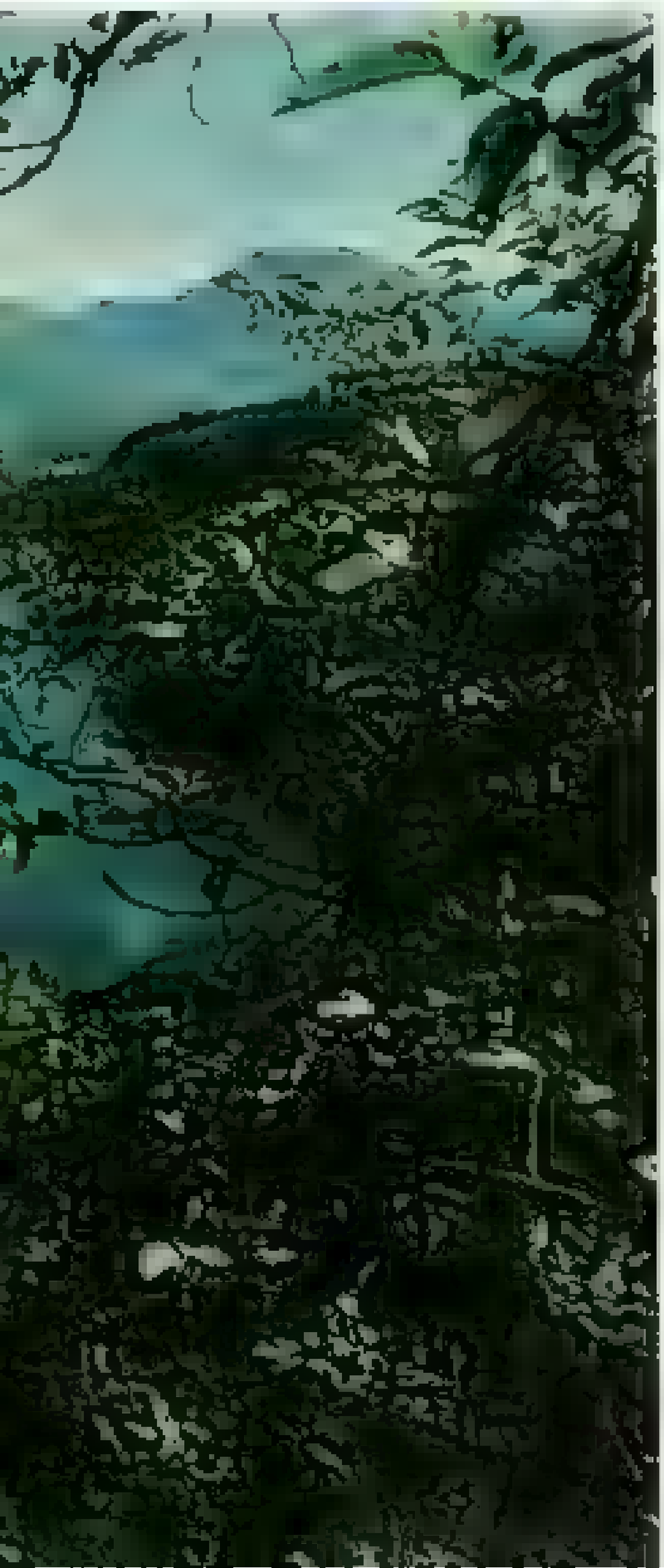


From Inspired Isle of Blue

[illegible]

Voyages on a Lake Inspired Dreams Like a Sapphire Amid Crystal Aps

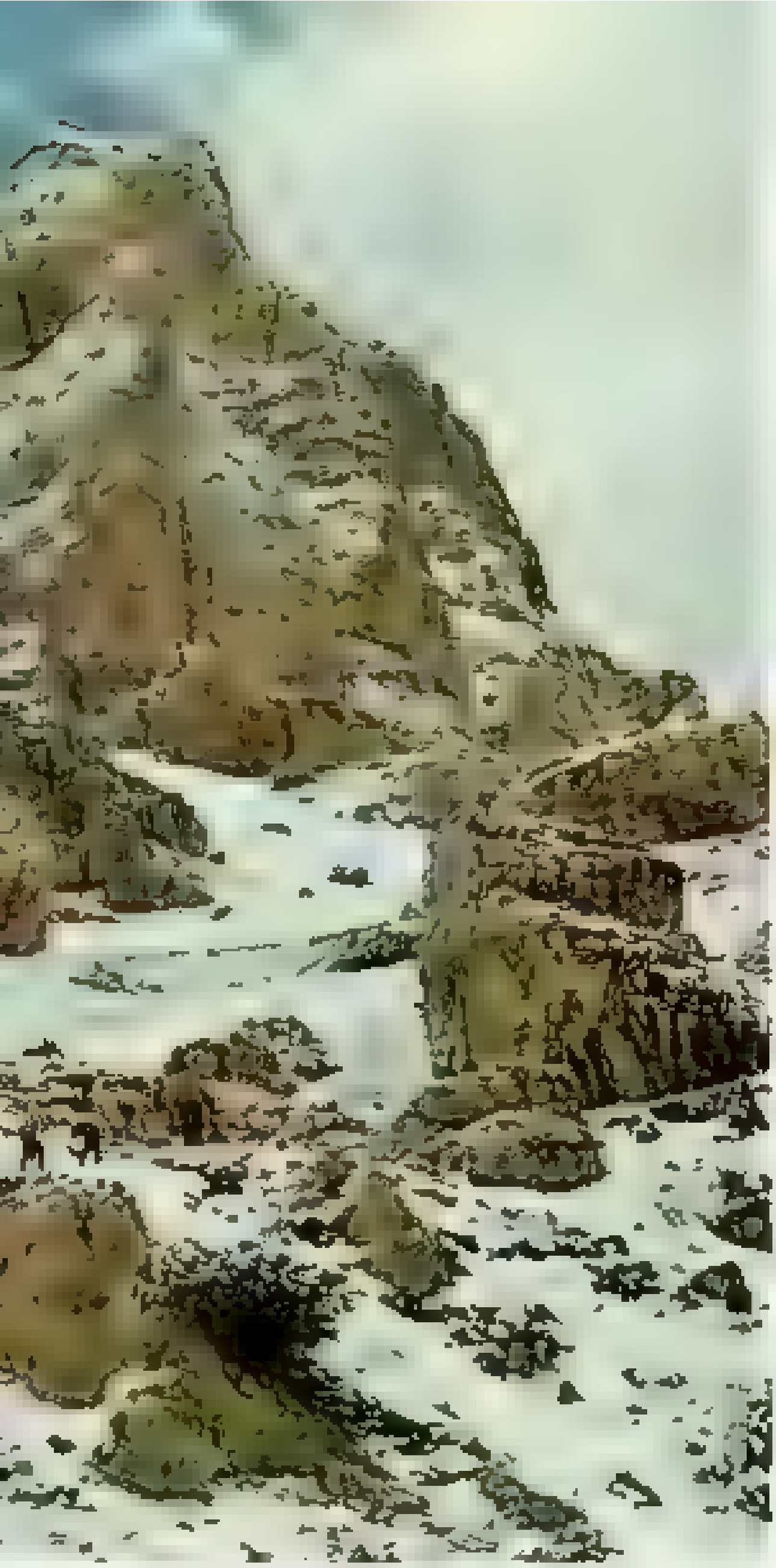
[illegible]



[illegible]

What Water Challenges Canoeists

[illegible]



Snow-dappled Dolomites [illegible]

[illegible] peaks to the sky [illegible] Aosta Valley. A [illegible] the Dolomite Alps [illegible] determined [illegible] peaks [illegible] to [illegible] West.

A[illegible]s and south to Brenta Massif, both covered with glaciers and dotted with falling snow. The snow has but two days before we [illegible] in the Dolomites was the last one [illegible] "This is the first one of fall."

[illegible] used on as [illegible] the Italian Lakes, a retreat from the [illegible] Roman world since Roman days. We drove along the west [illegible] Lake Como at dusk while the lights [illegible] and villages came alive as in a fairyland.

Last Look at an Alpine Meadow

In the Valle d'Aosta, Italy's French-speaking corner, the Matterhorn was calling us [illegible] for one last look, and we took a side road to Cervinia-Breuil. [illegible] Italian Lake. No one had climbed it since snow had fallen [illegible] before. The [illegible] was [illegible] for the next [illegible]

[illegible] charge of the two [illegible] Cervinia. It was [illegible] who led called the construction crew that had built the cable [illegible] near Chamonix. The Matterhorn [illegible] allowing to be [illegible] lines and a wide [illegible] and flat [illegible] pause on [illegible] New [illegible] out on a [illegible] and dense mist. We waved goodbye to the invisible Matterhorn [illegible] the Valtournenche [illegible] mountains. Here the shining sun beckoned us along a trail to a new-cut meadow [illegible] grass, flowers and elemental earth.

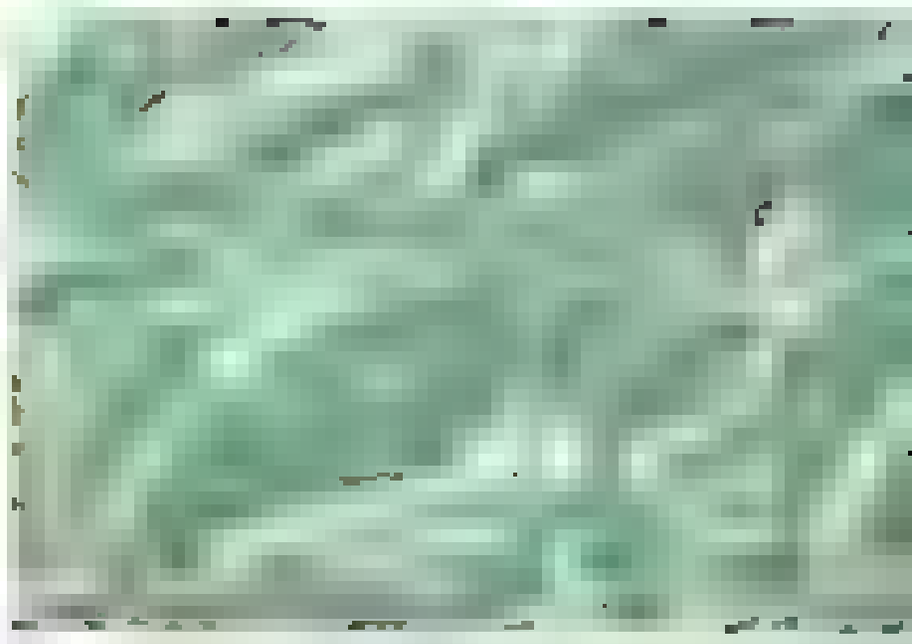
We spread a picnic lunch, then lay [illegible] backs and watched the fleecy clouds scud past nearby snow-topped heights. Sad only in [illegible] on the snow. [illegible] enough, a couple of campers were [illegible] to reach the [illegible].

It was time to take leave of the A[illegible] where men and [illegible] have lived as many [illegible] the Alps [illegible]

[illegible] and ownership of this life that is [illegible] people. Here the golden eagle nests in the [illegible] the woodcock [illegible] and [illegible] with the ground cover. Who knows? Perhaps the Alps [illegible] belong to them.

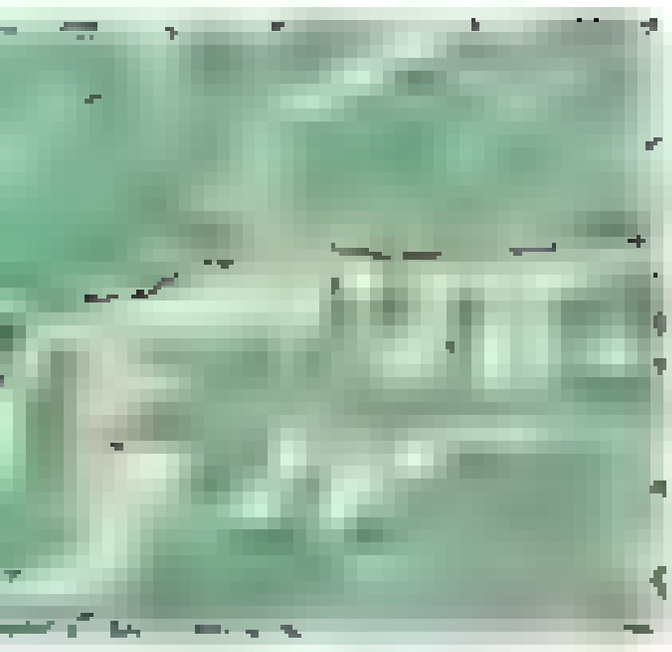
[illegible] deserved its famous [illegible] known [illegible] among [illegible] as we drove to Bolzano, [illegible] in [illegible] resident [illegible] Austria's Tyrol before World War I and many [illegible] speak German.

Every day we bought picnic supplies and [illegible] at some sweeping viewpoint. A [illegible] made we [illegible] at the [illegible]



Europe's

Switzerland, Austria and Northern Italy



Mountains spring to life with length, breadth and depth on Mr Keller's The Alps – Europe's Backbone

snowy crown portrayed on double map

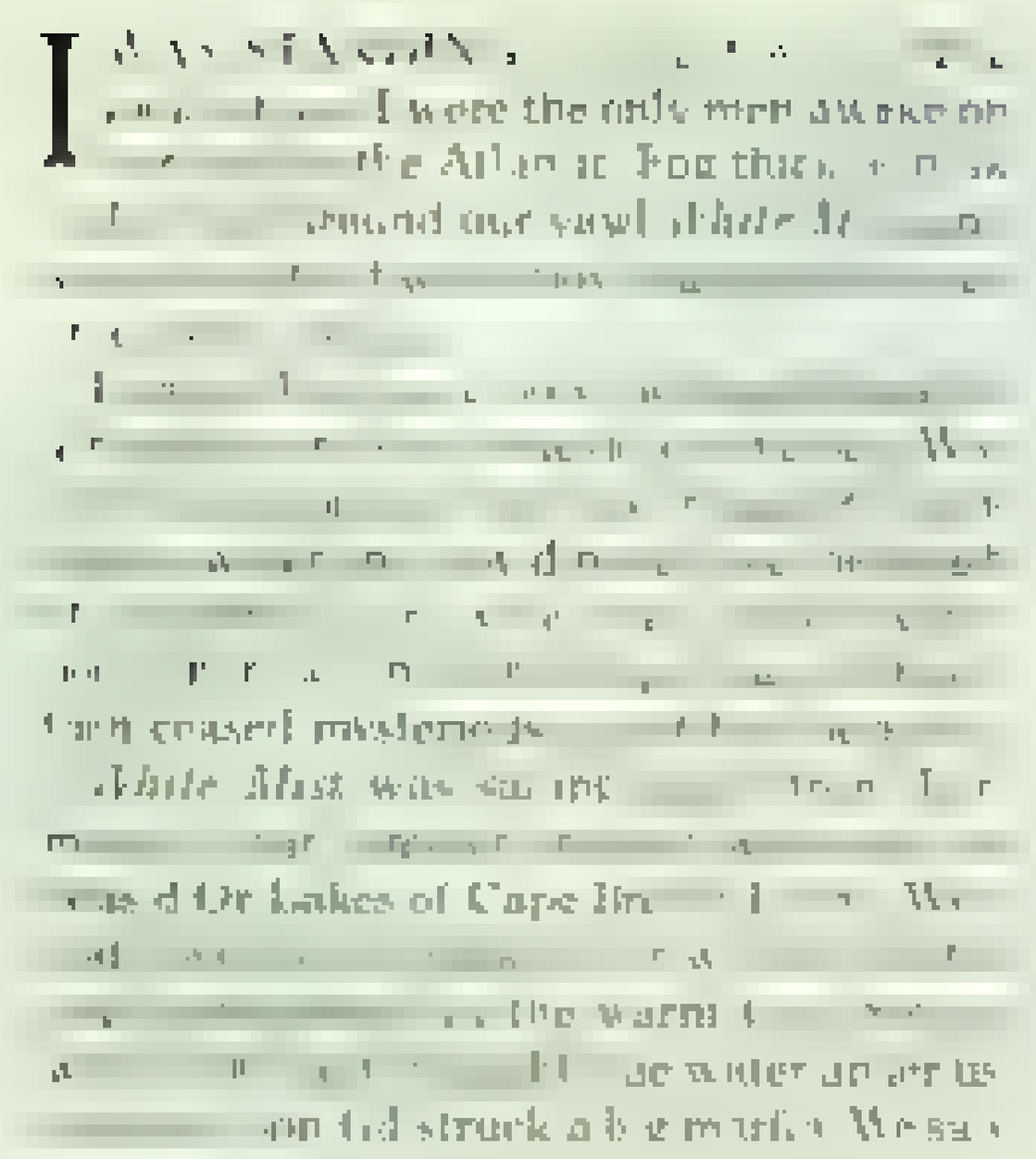
Mont Blanc's crews are blest as an [illegible] of equal length near [illegible] San Tuano St guides to the [illegible] San Bernardino Tunnel [illegible] [illegible] feet below Th[illegible] [illegible] Switzerland, Austria, and Northern Italy [illegible] [illegible] Another, [illegible] [illegible] alongside Via Aurelia, the

Safe Landing on Sable

Isle of 500 Shipwrecks

BY MELVILLE BELL GROSVENOR
LL.D., Sc.D.

President and Editor, National Geographic Society



I [illegible] I were the only men awake on [illegible] the Atlantic. For three [illegible] around our vessel there [illegible] crashed mysteriously [illegible] White Mist was [illegible] of the banks of Cape Breton [illegible] the warm [illegible] the wonder [illegible] struck a big [illegible] Messa

[illegible] and ebb at 7½ knots, we even had the excitement of breaking an engine on a lee [illegible] rockpile [illegible] run into fog. Checking tidal charts, I found [illegible] leaves U. S. shores with tropic waters and, [illegible] across the North Atlantic [illegible]

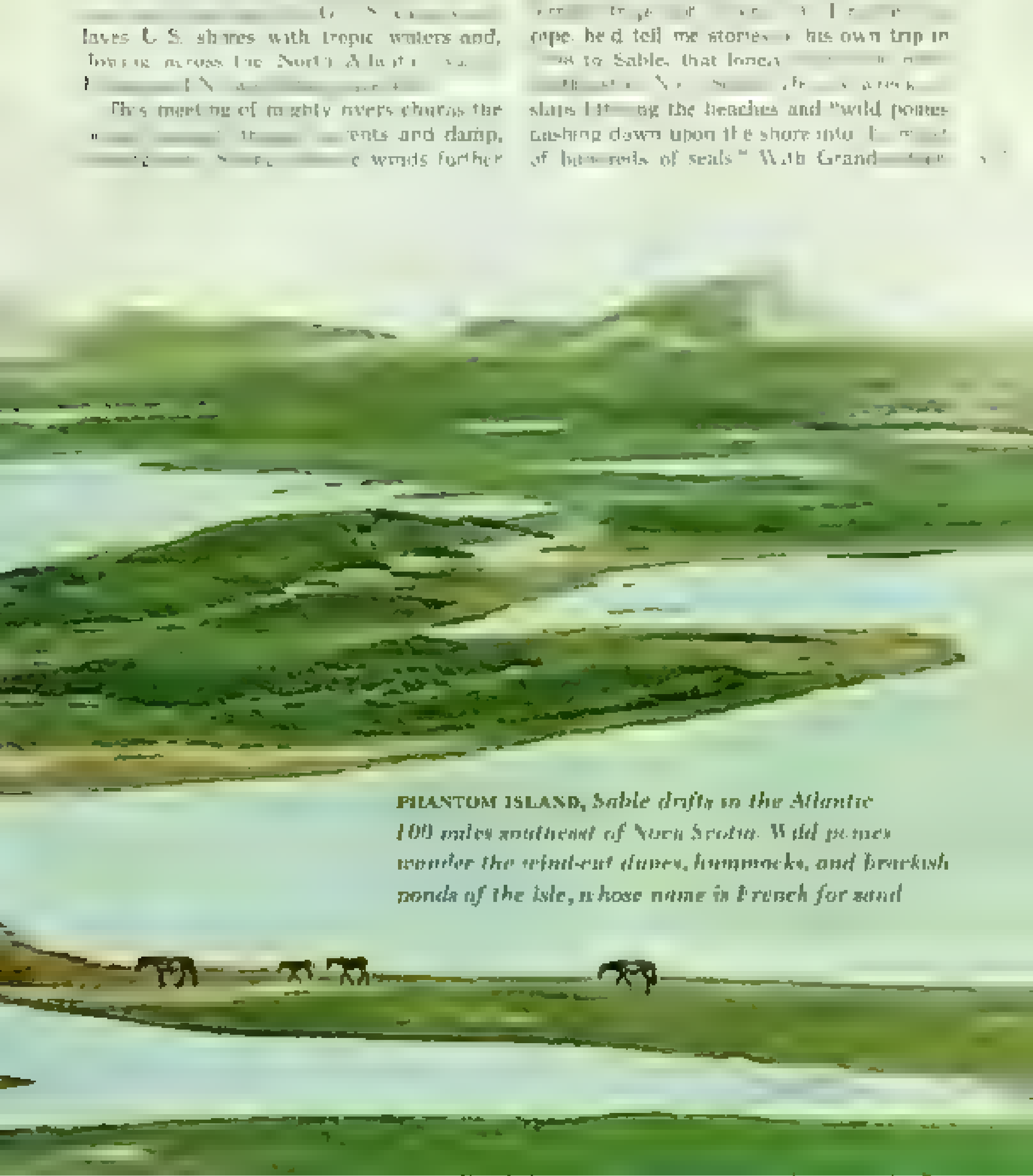
This meeting of mighty rivers churns the [illegible] ents and damp, [illegible] winds further [illegible]

[illegible]

We must be on guard [illegible]

Shipkiller Sable Waits for Prey

[illegible] name brought back [illegible] rope he'd tell me stories [illegible] his own trip in [illegible] to Sable, that lonely [illegible] slaps lifting the beaches and "wild ponies crashing down upon the shore into [illegible] of hundreds of seals." With Grand [illegible]



PHANTOM ISLAND, *Sable drifts in the Atlantic 100 miles southeast of Nova Scotia. Wild ponies wander the windswept dunes, hummocks, and brackish ponds of the isle, whose name in French for sand*

Hugging the fend, [illegible] 25 feet." Crew [illegible] White Mist has first [illegible] at Wa[illegible] [illegible]

In pleasant astonishment, [illegible] well though [illegible] George Beck of [illegible] stands at high

mes out from the islands tip. For [illegible] we had been pushing a course well clear. Still Cal wondered what the currents [illegible] in this red soup.

No [illegible] yet from Sable's radio beacon. Vandy Cal tried for a sl[illegible] of [illegible] with a s[illegible] Hardly. [illegible] would but for a moment," he complained. Without a true horizon, he couldn't observe the sun's latitude and find our true position.

But the fog grew thicker. Moving at 5 knots we steered for [illegible] but, cod, [illegible] sh abound in these waters.

[illegible] I turned and I waited for any sight break in the fog. When it came, he raised his sextant [illegible] compute his position. A moment later he called [illegible] "Wow! We're way off course—[illegible] the dead [illegible] the western shoals! I can't be [illegible] The [illegible] must be false."

To be safe, he guesses figures [illegible] then ordered [illegible] Sable's strong currents had apparently set us miles to the east.

"Let's skip those plans of landing on Sable."

Unusual fogs make great goals on Sable

The ski piper recalling how Parsons launches [illegible] surf [illegible] for five hours, then prayed for the beach on a "smooth" swell, six years earlier he had gone [illegible] landed here in a large surfboat used to bring crews ashore through breakers. Sable sees a minimum today. *Horse West* rides at anchor on 30 feet of water [illegible] offshore. Sailors [illegible] steam, [illegible] from American bargeman [illegible] for [illegible] and flying [illegible] rather reflective at the strangers.

Yet it [illegible] cost us an extra day [illegible] even if we [illegible] away.

Yet a [illegible] States Navy test pilot and *Mike Mest's* sailing master understood the hours. He remembered what the Canadian officials had told us: "There's a constant surf on the beaches—and no harbor whatever," they admonished. "No small boat should approach or land on Sable Only in mid-July for a three week period is the weather calm and [illegible] and there's almost constant fog."

This was a foggy July 13. Would we get a break? If we did, I was determined to try.

By mid-day we were close enough to take a radio bearing to receive accurate bearings, which proved we had sailed 6 miles farther west than presumed.

Gal's suspicion about the sun sight was confirmed. Mist had [illegible] the horizon to see.

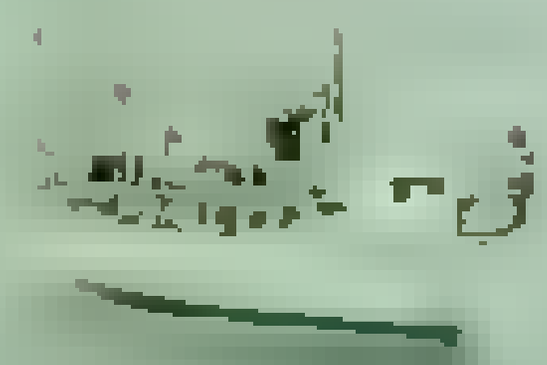
"It's easy to see how early navigators wrecked their ships here. Suppose our error had been the other way, and we had changed course eastward toward Sable's shoals?" Electronics makes my job easier and safer.

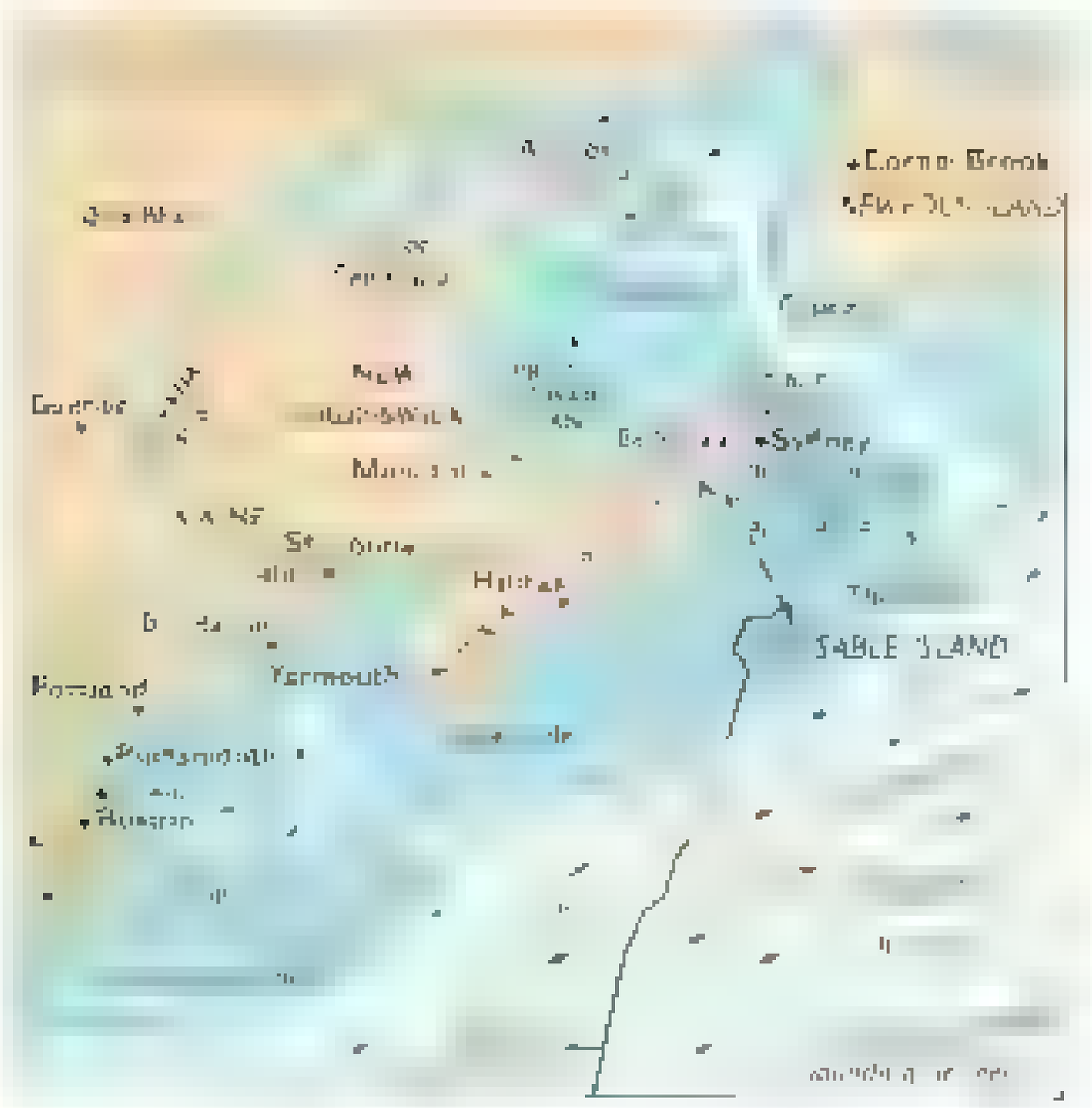
Shifting Shoals Make Charts Treacherous

During the night we steered a zigzag course around the western shoals to the north of Sable, watching our fathometer all the while. In well charted waters we could have followed our track by the peaks and valleys of the ocean floor. But Sable's shoals shift constantly and charts are unreliable. Our Sorting Directions told us the sands drain from in waves—unpredictable and undulating.

Horse West altered course at 1:45 a.m. to run down on Sable's radio beacon, because [illegible]. We were [illegible] when our fathometer was working, for it registered "no bottom." Time and again we hove to and checked with the old fashioned hand line. No bottom.

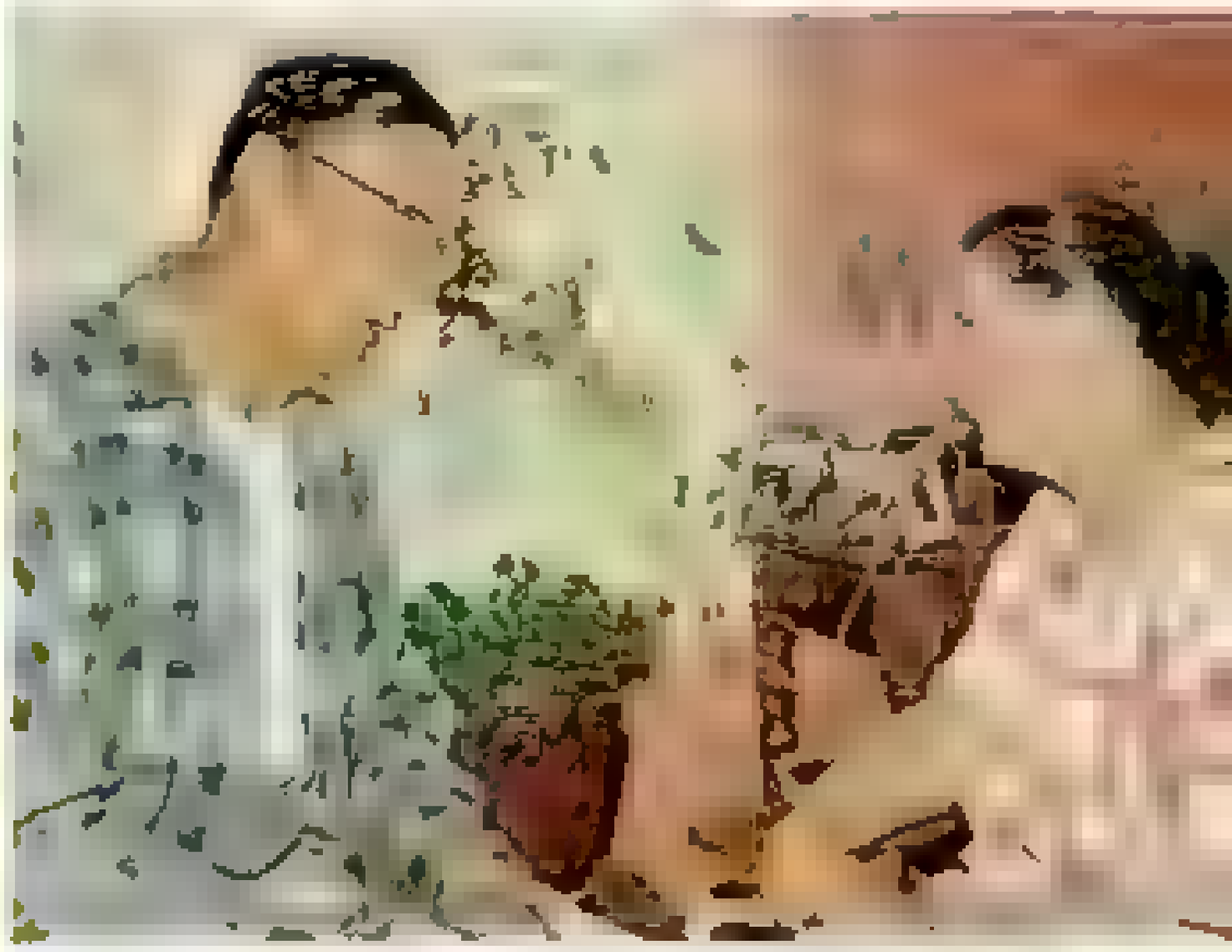
Hitting the beacon at 4½ knots, we picked




Yarmouth
SABLE ISLAND

Safe Landing on Sand

[illegible]

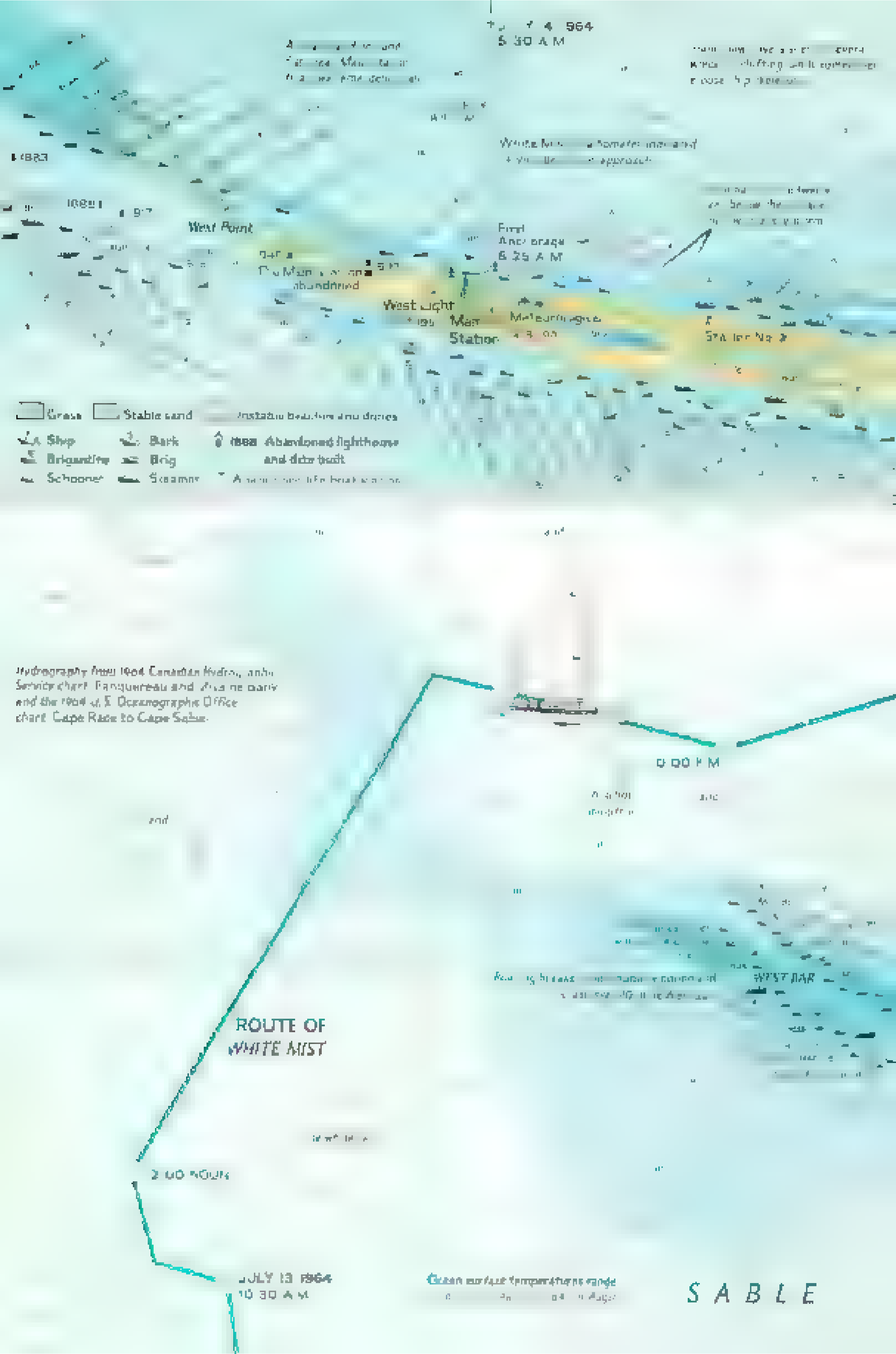


Anthony's new friend comes. [illegible]

[illegible]

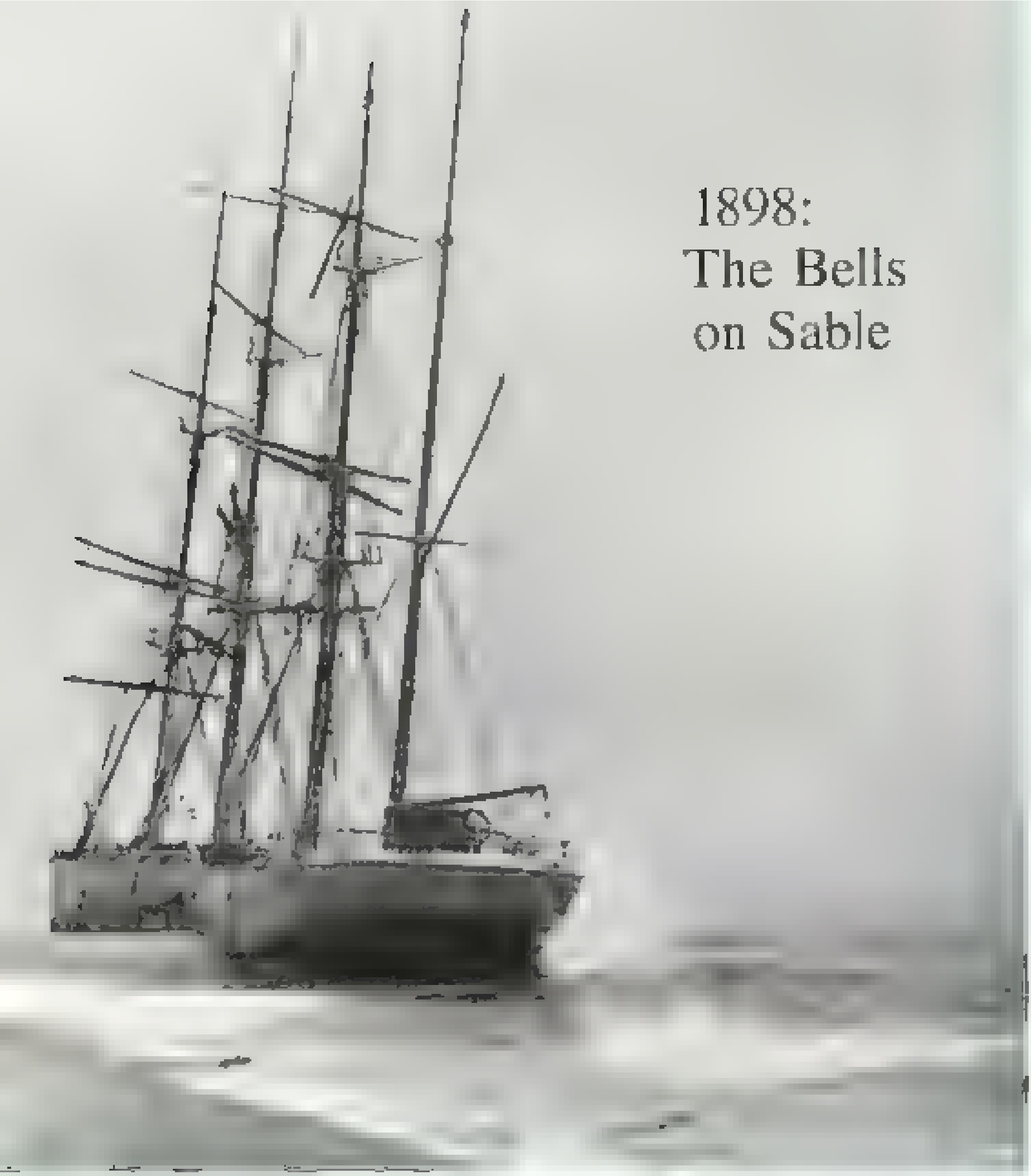
Wind whipped waves [illegible]

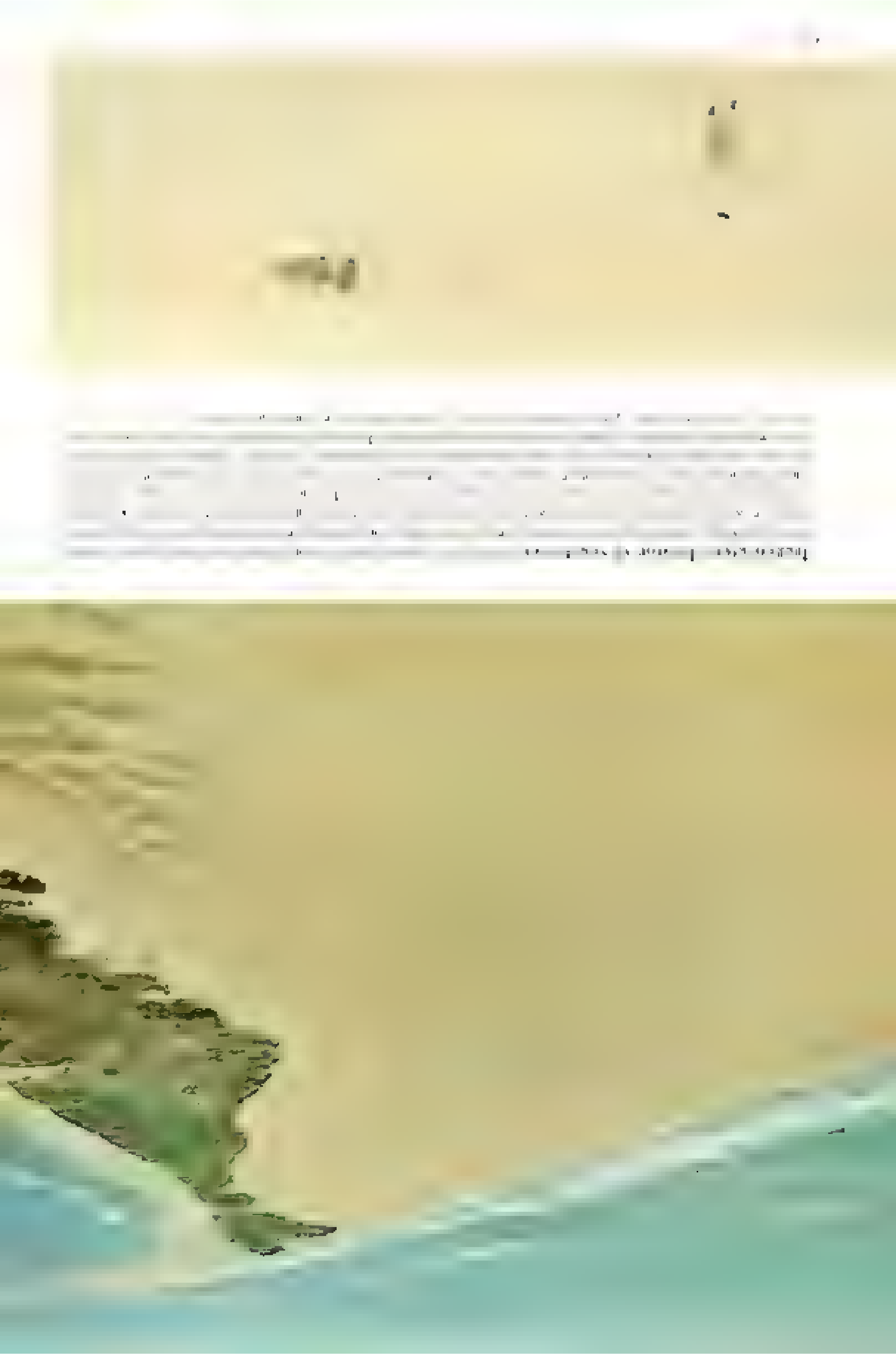
[illegible]

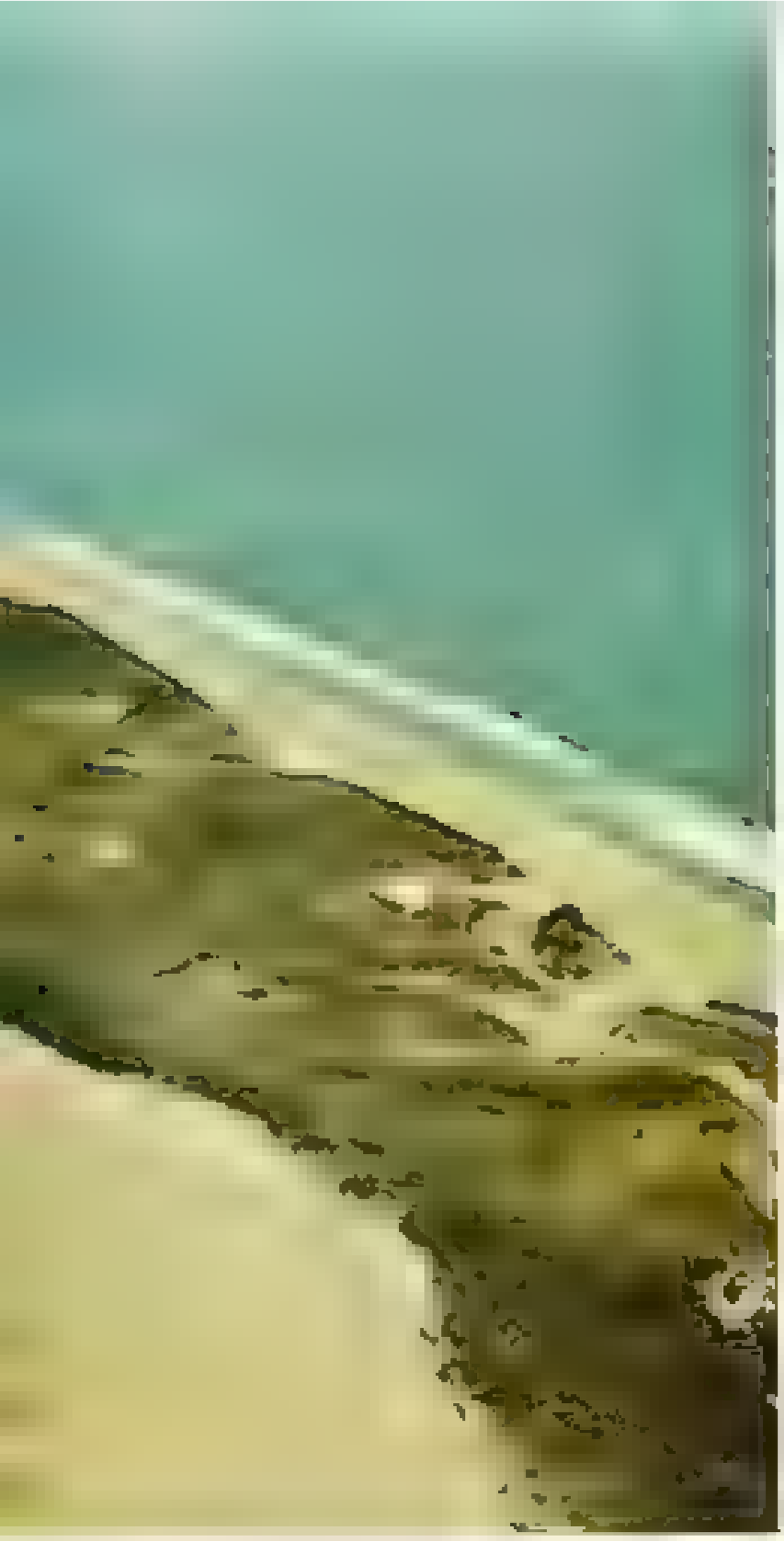

5 30 A M
West Point
First
6 25 A M
West Light
Grass
Stable sand
Ship
Bark
Brigantine
Brig
Schooner
Steamer
Abandoned lightheaven
and date built
Hydrography from 1964 Canadian Hydro. and
Service chart Fanquenreau and Alva ne Banks
and the 1964 U.S. Oceanographic Office
chart Cape Race to Cape Sable.
ROUTE OF
WHITE MIST
2 00 HOURS
JULY 13 1964
10 30 A M
Ocean surface temperatures range
WEST BAR
S A B L E


SABLE ISLAND
Graveyard of the Atlantic
Known wrecks since 1800
JULY 14, 1954
1 15 A.M.
5 30 A.M.
THE GULLY
ISLAND BANK
AREA ENLARGED ABOVE
East Point
West Point
Decca Lambda Station provides
Fort Point
East Light

1898: The Bells on Sable







Maybe we should keep our eyes down to our "the ugh house" suggested Ar

Following the rusty shore, we motored slow [illegible] through sugar the constitution [illegible] here was large [illegible] we first anchore[illegible]

[illegible] clot in the green sand well I saw [illegible] house "We'll try a land up here [illegible]

Increasingly the seas were [illegible] shades swirl [illegible] lures standing watch aboard *Hyde Away*. From [illegible] what could happen [illegible]

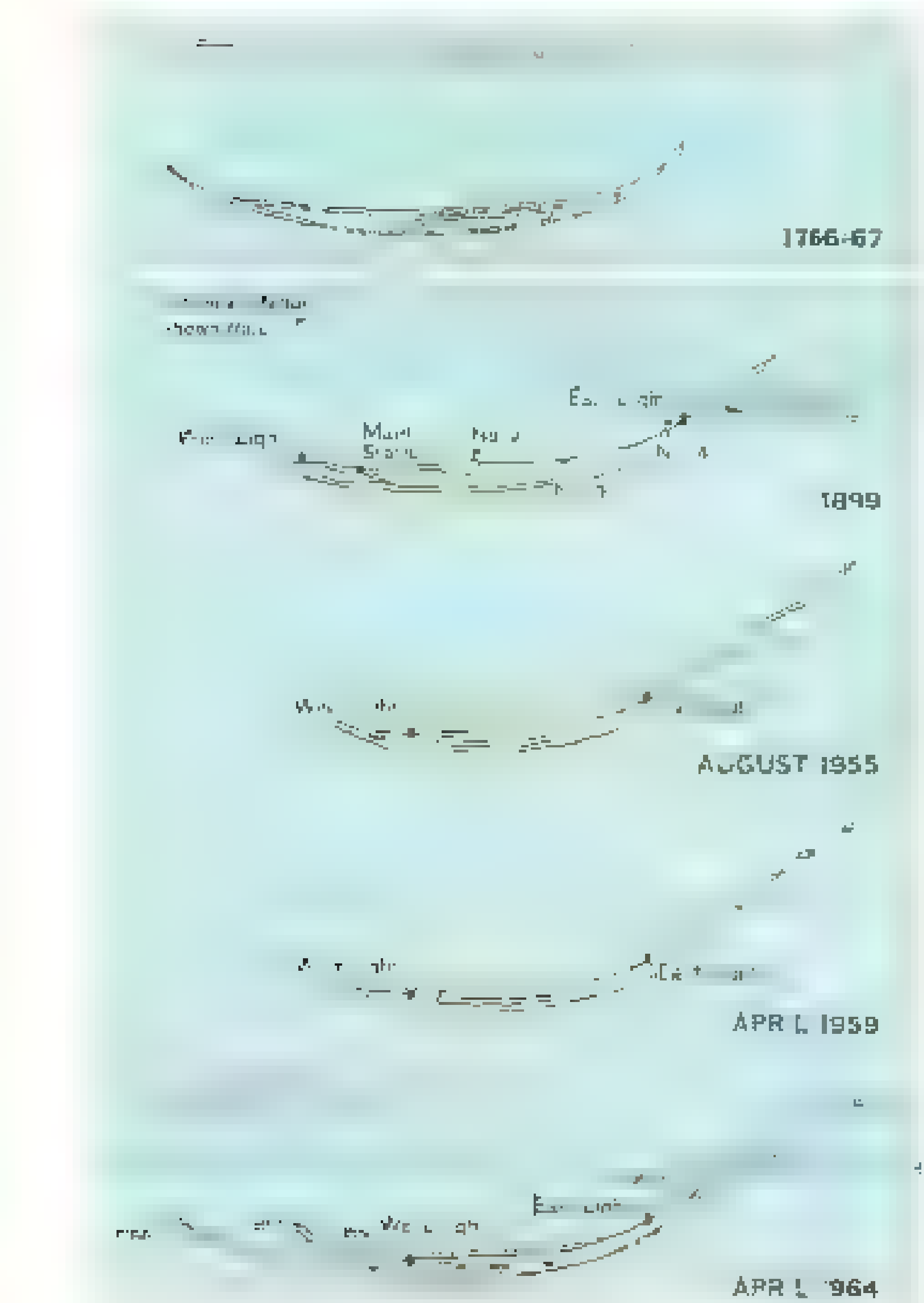
Astonished Islanders Greet Guests

Calm as the water seemed, the swells were more than enough for our 32-foot craft. But the [illegible] made it to shore. Though a wave [illegible] on the first trip—in water [illegible]

big swells, I ran row like Old Harry for shore. We trim the same fast, and I stepped ashore almost dry-shod (page 40).

I saw no one, heard no sound except the roar of Atlantic swells breaking on West Bar. Wisps of fog still clung to bedraggled spruce. The place was as chill as the ghost stories that haunt its place.

Furtively I felt eyes upon us, looking up



Lighthouse, then, I saw I was right. A large black station, ears up and transfixed by the wind, challenged us like a sentry. A flash of his tail and he was gone. Yes, he was at home roamed Sable.

Loose sand pulling at our feet, we labored up the dune. Below us lay a green vale with a cluster of houses, a village moving from the

"Hoodoo," Gil said, pointing. A man and woman knelt in a patch of green.

The woman lifted her poke bonnet and peered at us. I waved. The bonnet bobbed down, and she resumed her work.

"I'm sure she saw us," I said, as once not of all sure.

Again she raised up, then quickly down. Without waiting to, I thought of pirates and smugglers who once had lived here.

I walked toward the woman, holding out

Creeping crescent of Sable is slowly engulfed. Gen angry-looking waves and current are [illegible] by violent storms, gnaw away the western tip and make a [illegible] at the island's opposite end.

From [illegible] year [illegible] Lighthouse [illegible] Capt. [illegible] west of Alexander [illegible] as washing away [illegible] wrote Superintendent [illegible] Lighthouse in 1914 "that it is now very near the house."

[illegible] West Light stood [illegible] to the [illegible] of [illegible] Lake Wallace [illegible] Hall's spar [illegible] protected point of sand [illegible]

[illegible] groups [illegible] Hall [illegible] Island's [illegible] movement other than seasonal changes, as might be expected in such a short [illegible] of time. Long eastern bar [illegible] the fall of 1953 seems to be breaking up. [illegible] 1950 and 1964 shoreline maps may only reflect winter's ravages.

my hand. She and the man scrambled to their feet, scattering strawberries. "But how can you get here?" he asked incredulously. "No one has access to this island for years except from a government boat."

"You came out of the sea and fog," she said. "I thought you were ghosts."

Faces were the Norman Beals, who had emigrated to Canada from Humfries, Scotland (page 40) for a year. They had avoided Sable

where he tended the dies [illegible]

[illegible]

My maiden name is Bel[illegible]

[illegible]

Wind Sandblasts Vegetation

The Bels gathered up their berries, [illegible] made our way to a nearby ponied tram [illegible] As we crossed the [illegible] we reached into a big freezer and pulled out [illegible] of ice cubes. A moment later we were [illegible] of the Bels' furniture [illegible]

house was cozy and attractive.

Pots of begonias and [illegible] bright [illegible] and [illegible]

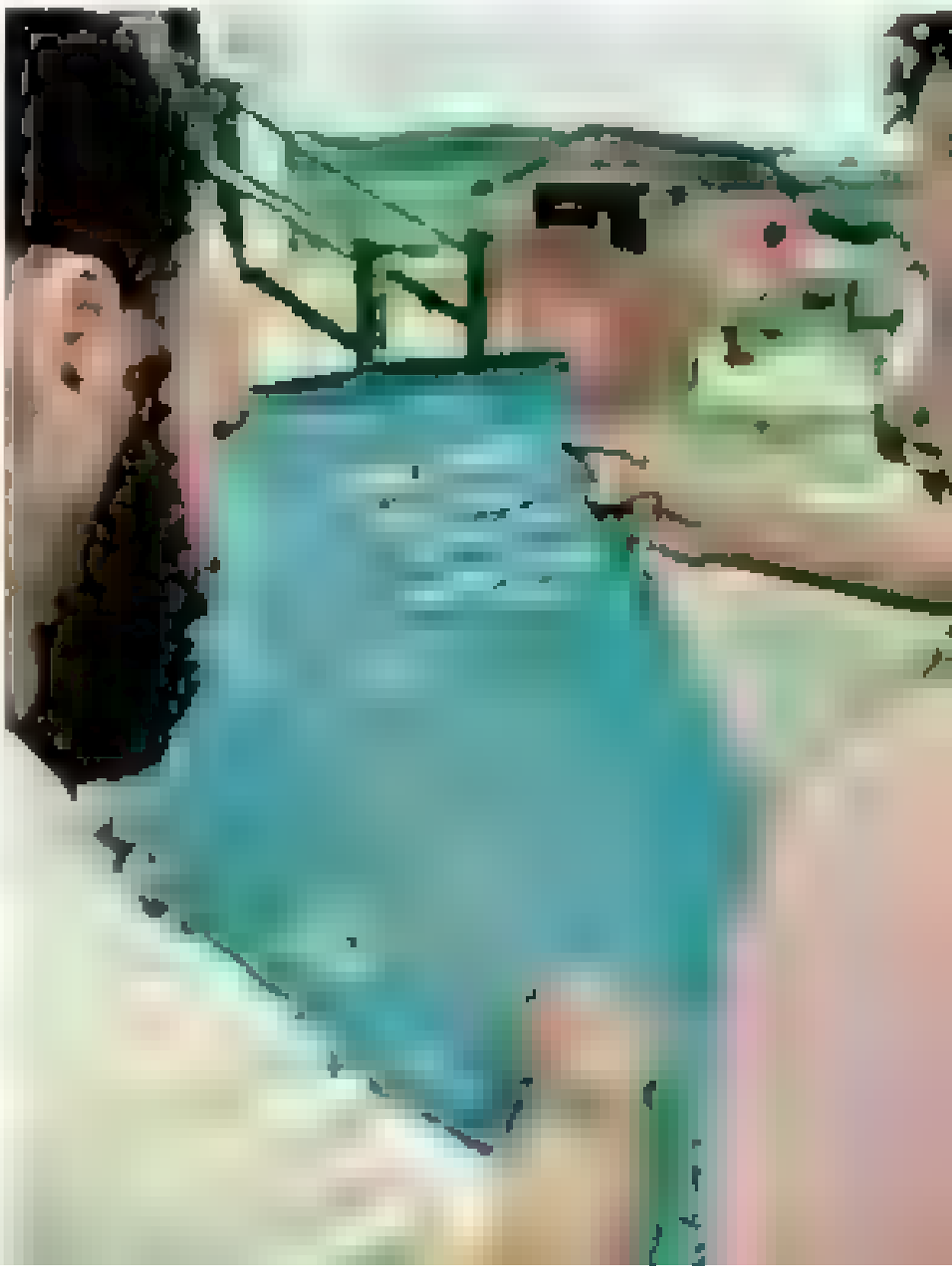
[illegible] of all vegetation [illegible] hours that the weather [illegible]

[illegible] "We [illegible] "[illegible] We haven't a single tree [illegible] "I'm interested [illegible] While is a Bahame [illegible]

[illegible]

[illegible] bers, perhaps out of pure dread, calculated the island as 200 miles long with [illegible] and retreated be[illegible]

Victim of explosive winds, [illegible]



"You can trace the [illegible] light houses," Mrs. [illegible] noted. Since the first light was built here in 1873, the sea has swallowed six, one after the other. Surf beats today over [illegible] saw well inland.

Dunes change overnight in storms, an[illegible] [illegible] as that after a severe storm in 1963, an island resident found the exposed skeleton of [illegible]

"And with the bones," she added, "she found some [illegible] British coins dated 1760—and [illegible] ket buttons and a shoe buckle."

[illegible] were wounded men going home from the wars.

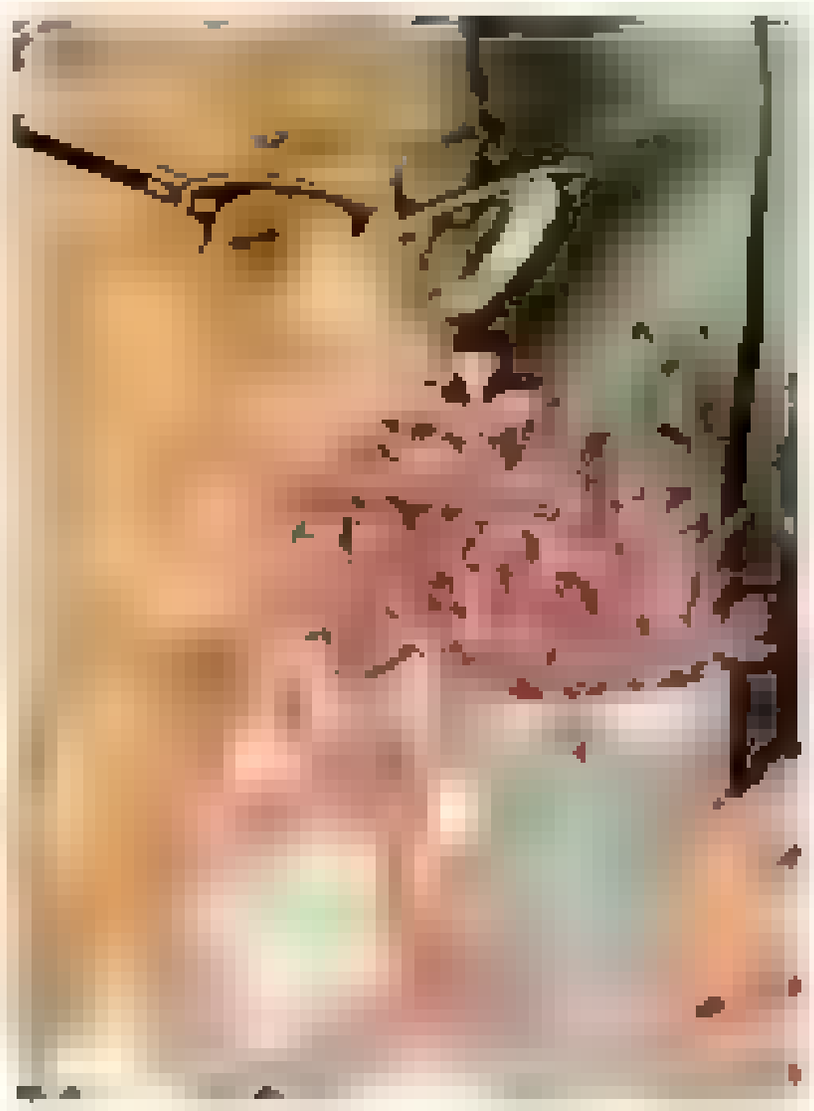
Or was this ship lured upon the shoals by ship wreckers who murdered the crew for the cargo? No one could be sure.

We [illegible] know that in the autumn of 1[illegible] with every soul. She was bringing from [illegible] the equipage of the Duke of Kent [illegible] ing of the *Frances* Sto[illegible] were [illegible]. Jewels and rare artifacts seen in the homes of [illegible] Sable Island," men [illegible] explained. Some said that [illegible] the *F*[illegible] [illegible] dered for their treasures. A proclamation [illegible] victims owed their lives to these lifesa[illegible]

Pounding along hard, wet sand [illegible] pass the south beach. In days when ships struck Sable [illegible] [illegible]. They peered through [illegible] other fogs and s[illegible] [illegible] Today's riders pick up bottles released from [illegible]

over the beach

Ready for launching



Inspection crews prepare rockets

Forward observing

[illegible] breeds since produced are so much larger and stronger than the original ponies that they can be used for the work of the station."

Wild Rides, Soft Landings

Mr. Harrington and his assistants arrived a few minutes after on the island's only "buggy," a lumbering tractor and trailer.

"Welcome to Sable Island," Mr. Harrington said, swinging through his luxurious sable-lined beard. His assistants hopped aboard ponies bareback for a rollicking romp. We [illegible] called it is a road. [illegible] swung through the [illegible] passed the riders [illegible] into the sand.

"Only three ponies on the island are tame enough to ride," a young man told me. "The only one is cart-broke."

But nature strikes a balance between the ponies' high spirits and sugar-soft sand. I saw not one mark on the whole island.

I decide to show you a more of the island's weather stations and the wreck of the *Woodcock*," Mr. Harrington suggested.

As the bus shuddered in the dense sand, [illegible] about [illegible] We call this a road. [illegible] swung through the

Splash of red [illegible]

Crowning wind on Sable, [illegible] the coastline [illegible] waters of the [illegible]

[illegible] spurious [illegible] Sable [illegible] they [illegible] each summer to feed. In shelterless hollows [illegible]

[illegible] expert.

I've watched the storms were [illegible] with an up girls. "The only two women on the island," Harrington explained, "are in [illegible]."

Two men watched a television screen. Not [illegible] yard as I looked. I could see only "[illegible] the picture from Sydney [illegible] don't think [illegible]

I [illegible] Storms are very dramatic. He told us a [illegible] waves exploding on the shoals and rolling up the beaches, then [illegible] us with snow, grass frosted in the morning, storms in a single season.

Hints Such Castaways Essays

During such storms rescue boats often saved lives. Doug Harrington showed me a [illegible] for 1855. "The Australia struck on the N.E. bar [illegible] The crew [illegible] to the wreck to [illegible] brought on shore. It was [illegible] possible for our men to go the [illegible] these poor fellows had not had [illegible] refuge." Wrote a [illegible] wrote the [illegible] navigation [illegible] forever altering the eastern shoreline [illegible] being seven miles [illegible]

These broke out charts that [illegible] [illegible] cor. The dotted [illegible] the long crescent [illegible]

Navigator Cal was fascinated by the [illegible] "Most is [illegible] near here." [illegible] "What wreck is this?" [illegible] "That would be the schooner *Erma*," [illegible] 1946. I'd show [illegible] official report [illegible] charts [illegible] eyewitness. [illegible] 548. During a violent winter [illegible] reported [illegible] the north shore. A [illegible] *Hale West* [illegible]

All of a sudden I saw [illegible] an object to the north side head to windward. [illegible] we at first thought was a large [illegible] shortly after discovered that it was a small [illegible] five or six miles, and that she was [illegible] dead on a lee shore. [illegible] nerved he that [illegible] [illegible] Darby watched the [illegible] waves that "[illegible] like [illegible] Mountains [illegible] sea before the ship [illegible] When [illegible]

[illegible] see two men [illegible] with their [illegible] and her now stuck for some [illegible] safely ashore. Drag[illegible] explained how be[illegible]

He ashed her [illegible] to the beach. Darby [illegible] assistance [illegible] of his men below hatches, and [illegible] up the cabin door. He had [illegible] placed near the fire [illegible]

He then directed his two best men [illegible] to the crews, which were partly [illegible] with blubber scraped from the fish. They had each a wooden [illegible] [illegible] and threw it [illegible]

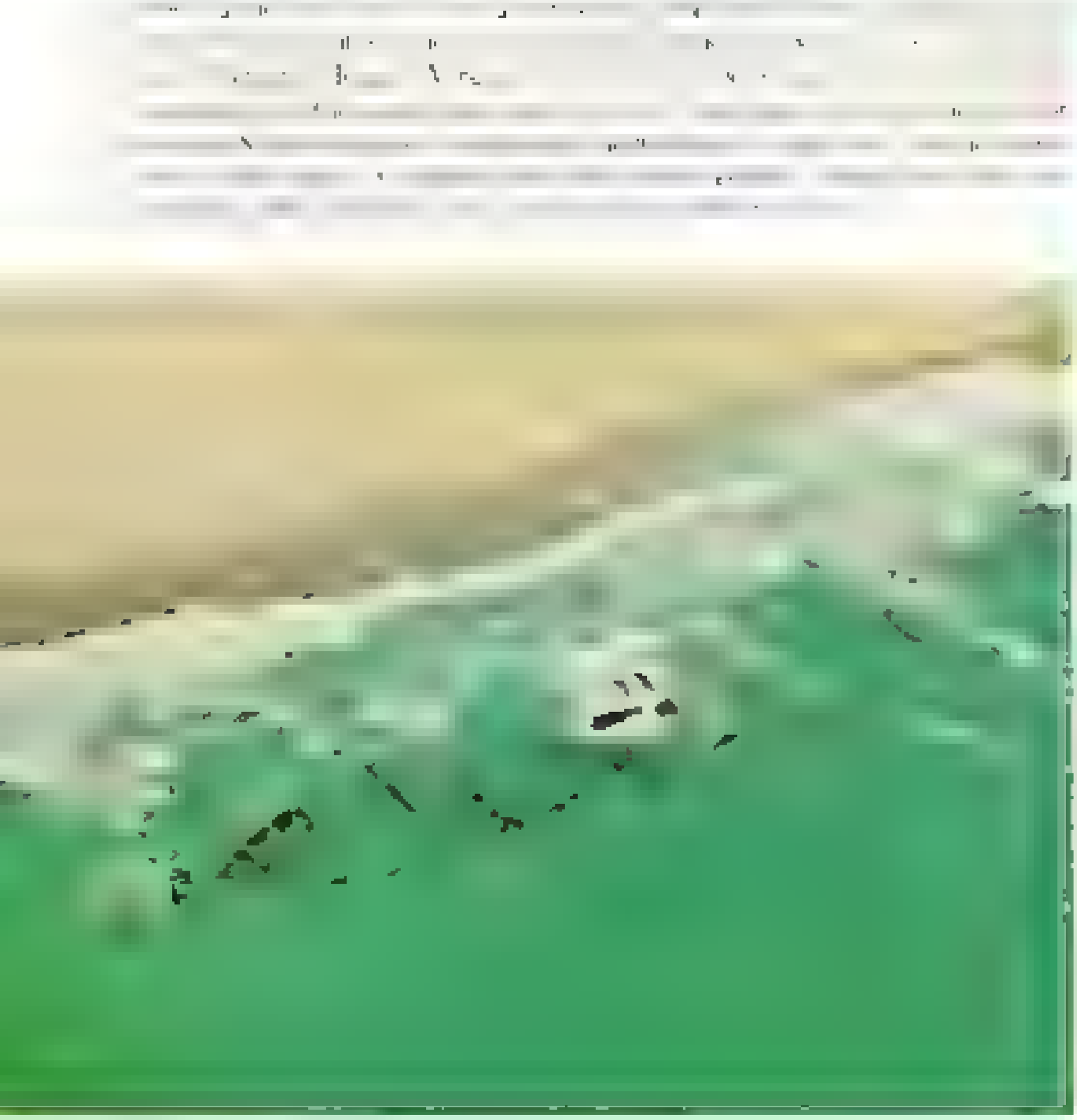
It was [illegible] but not a barrel of water [illegible] on deck [illegible]

[illegible] wrote Captain Darby in 1846—[illegible]

[illegible]

Where the sea turns killer

ATLANTE



To see the break [illegible] looks like a giant [illegible] south beach. Ter[illegible] [illegible] lest we [illegible] their nesting grounds.

[illegible] we enjoyed the seals. But [illegible] numbers have [illegible] [illegible] hundreds" and ev[illegible] thousands" on these beaches. At least their manners endured. As he reports [illegible] every seal had his head lifted watching our approach. They seemed to display no fear, only curiosity [illegible] at us. An uneasy feeling [illegible] with great rings round the eyes suddenly leapt out of the water [illegible]

Fog still hung over the island as we reached [illegible] [illegible] transient storm's crashed [illegible]

What [illegible] gale should blow up now? The [illegible] and these waves would so[illegible] grow in instrous, overwhelming us.

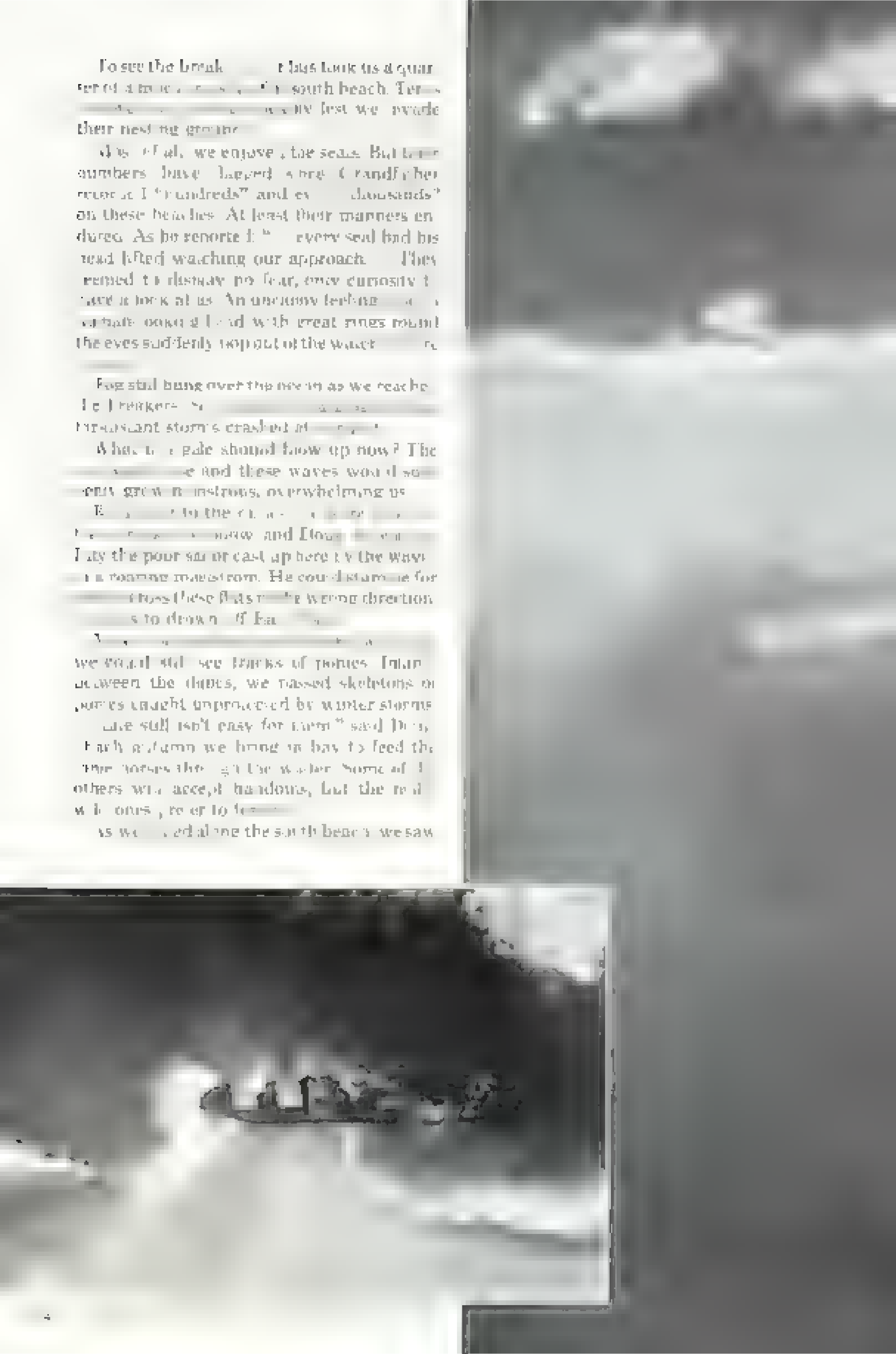
[illegible] the [illegible] and I [illegible] They the poor souls cast up here by the wave[illegible] a roaring maelstrom. He could stumble for [illegible] those these flats [illegible] wrong direction [illegible] to drown [illegible]

[illegible]

we could still see tracks of ponies. Inland between the dunes, we passed skeletons of ponies caught unprotected by winter storms.

"Life still isn't easy for them," said [illegible]. "Each autumn we bring in hay to feed the [illegible] horses that [illegible] the winter. Some of [illegible] others will accept handouts, but the real wild ones [illegible] to [illegible]

As we [illegible] along the south beach we saw

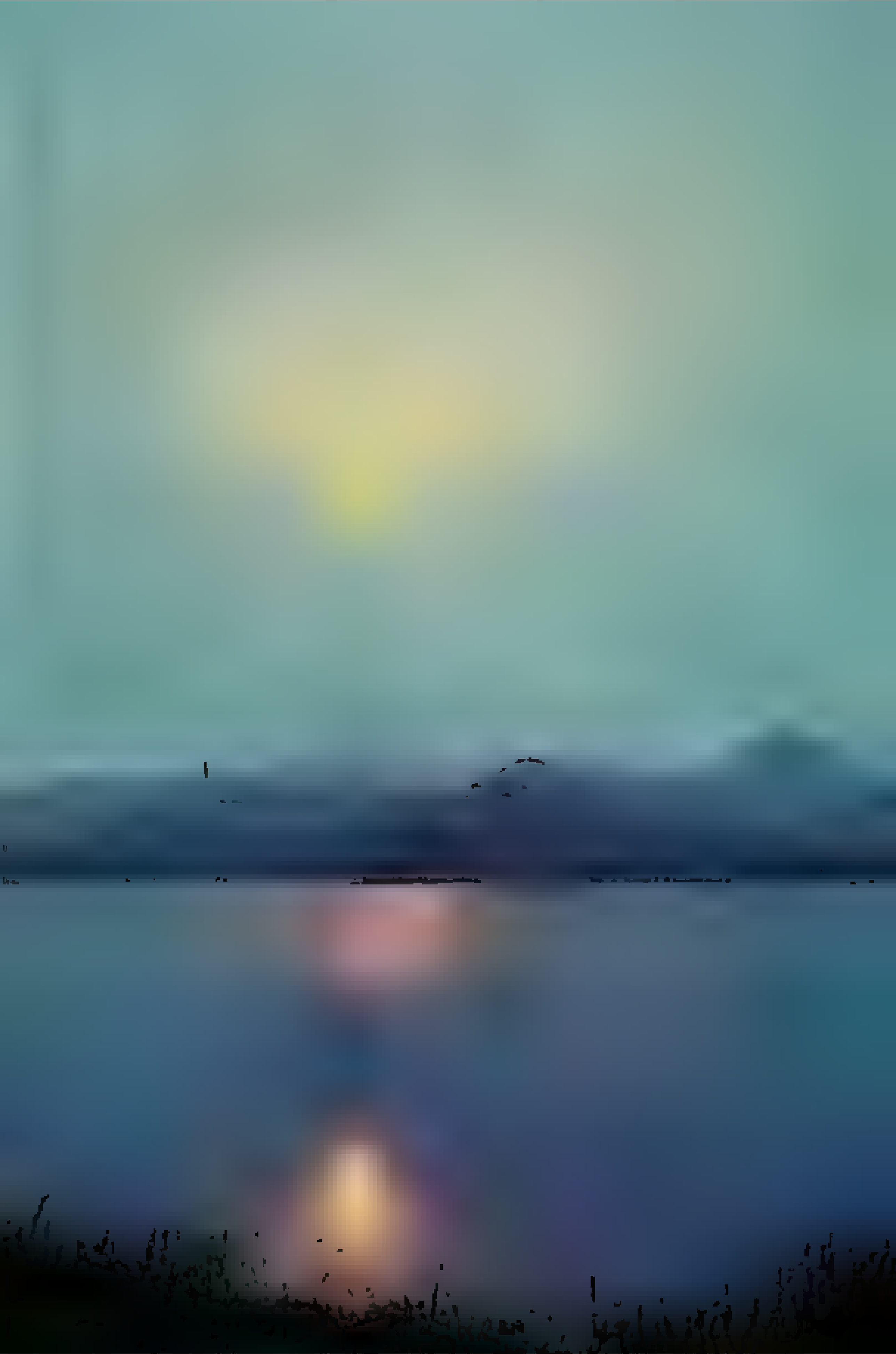


[illegible]

[illegible]

[illegible]

[illegible] and persuade [illegible] thank the sailors for saving us [illegible]



and the wreck of *Moravia* (a German liner carrying coconuts and wine). I stand at the window to watch the foaming white mountains of surf." When time was measured by shipwrecks, which of the sand-covered windows framed that view of violent seas?

Mrs. Boomer always included lonely bits of family news: "I have only one daughter home with me this winter. Bertha has always wished to take up the study of nursing. I feel it is better for her as she never was strong."

Her husband wrote to Grandpa: "I am dreading having to attack 6 or 7 months' back news. Of course, we are like those marooned, constantly watching for a steamer smoke and within the last fortnight all are out of tobacco, which to many of them is more serious than if out of beef. All of my household are thankful for good health."

Yet he was tragically mistaken. Soon the Boomers would learn that their daughter Bertha, the student nurse, had died suddenly of typhoid fever on the mainland. "The hardest part to us," wrote Mrs. Boomer, "was that the steamer that brought to us the news of her death also brought her Christmas remembrances to the household and she had then been laid to rest nearly two months."

One of these rooms had been hers.

"The old buildings are going fast," said Doug Harrington. "A crack opens, then on a winter storm a blast of wind gets in—and the house caves in."

"You have no boats now?" I asked.

"Only one—a small skiff," he said. "The boys use it on Lake Wallace when they go fishing or duck shooting."

The lake sprawls, green and marshy, for five irregular miles. Once it was open to the sea and used as a harbor. Out in 1876 two American sailing ships were caught inside during a storm and marooned.

Now Lake Wallace figures in Canadian folklore as the watery home of ghosts. Mrs. Copeland, a lady murdered by wreckers for a ring, returns in legend to display the stub of a missing finger—lopped off by her murderers. Like the Lifesavers' Ghost—a man drowned in a rescue mission a century ago—Mrs. Copeland has not been seen lately.

Five Waves—and Goodbye

The afternoon light was waning, and we [illegible] leave. The tractor took us past the [illegible] house and deep to the beach. We counted five large waves and in our little pram returned to *White Mist*. Alec called Radio Sable to say thanks and goodbye.

We hoisted sail, weighed anchor, and motored slowly to sea. Doug Harrington waved from the beach near the spot where the schooner *Acadia* had been. A herd of ponies moved in single file across the dunes.

Suddenly the green water paled, and I saw sand.

"Ten feet," shouted Alec. "Cut the engine—we're running on a shoal!"

Was *White Mist* to be caught after all in the sucking sands of Sable?

Gently we coasted into deeper water—and then I remembered that sand bar where we had first anchored coming in.

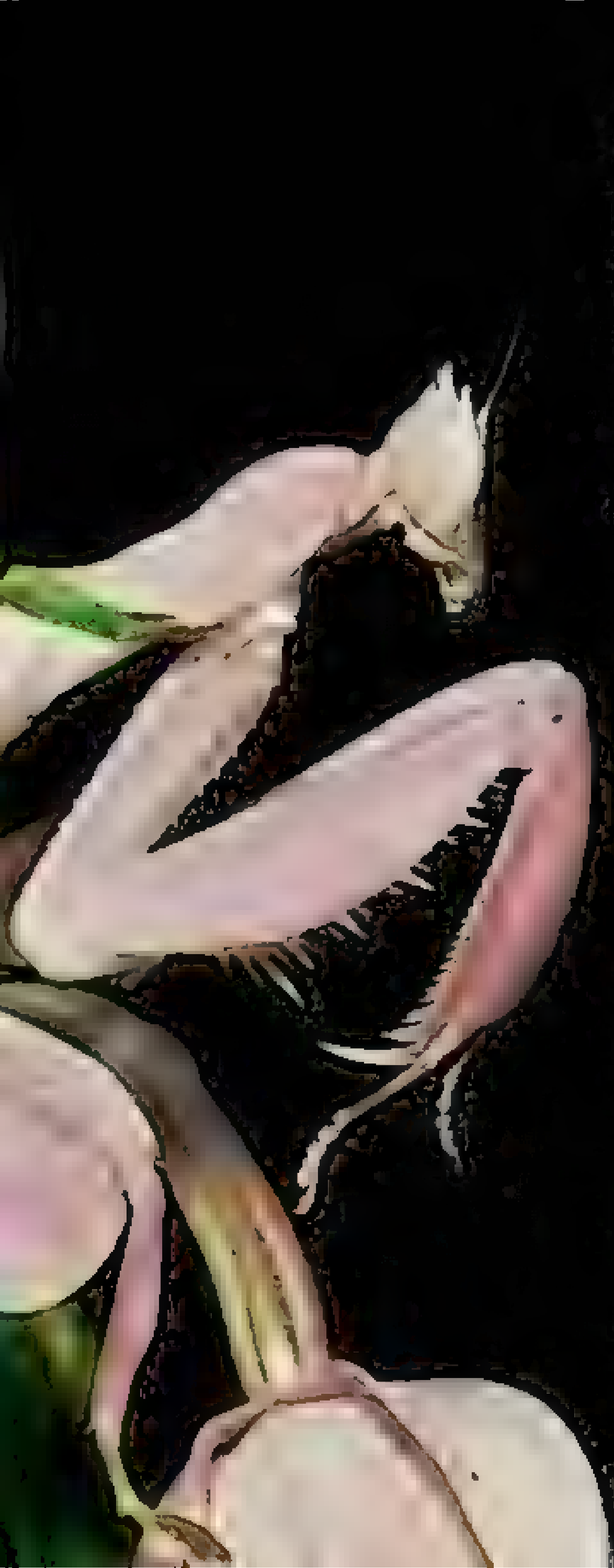
Heading away from our dangerous landfall, we steered clear of the shoals and breakers off West Bar. Our fathometer recorded again the undulating ridges, deeper, shallower, deeper.

And still Doug stood there—a motionless receding speck on the beach—a reminder that the only permanence on Sable Island is its loneliness.

THE END

Beware, all ships! Flashing its warning, West Light penetrates thick fog above Marconi Station on Sable's tidal pool.

Lonely hours of Doug Harrington watching *White Mist* put out to sea from Sable



Asian Insects in Disguise

Article and photographs by
EDWARD S. ROSS, Ph.D.

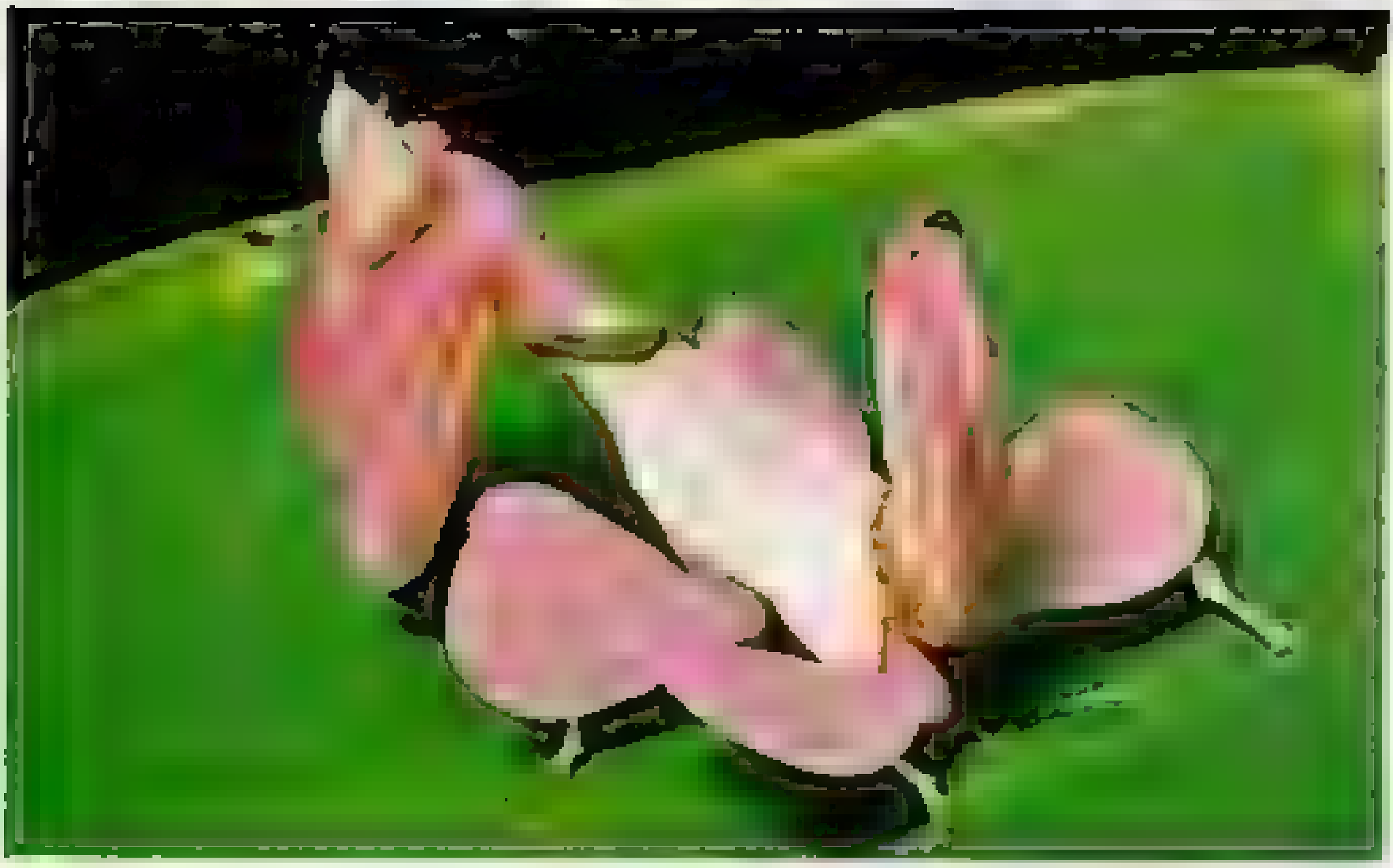
THE LUSH GREENERY of the Malay Peninsula's Gombak Valley languished in equatorial heat. Not a whisper of wind disturbed this tropic wilderness. A National Geographic Society grant had brought me here, halfway around the world, to hunt. Not for tigers but for smaller game—insects.

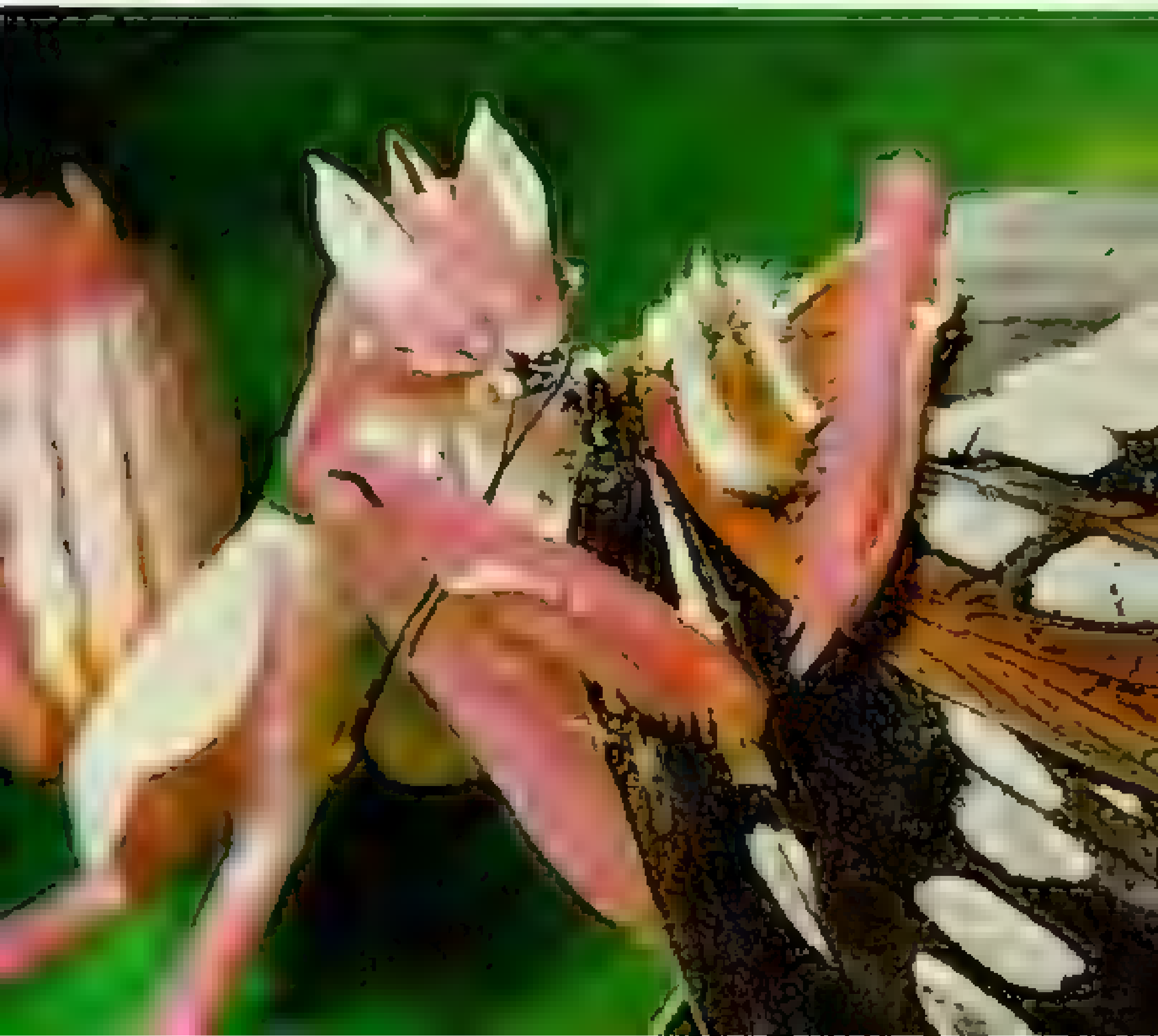
As I followed a delightful flower-fringed trail, I paused to admire a pink orchid that grew beside the pathway. To my utter astonishment, the orchid moved! I stooped for a closer look—and discovered that a large part of this incredible flower was, in reality, a praying mantis (*Hymenopus coronatus*).

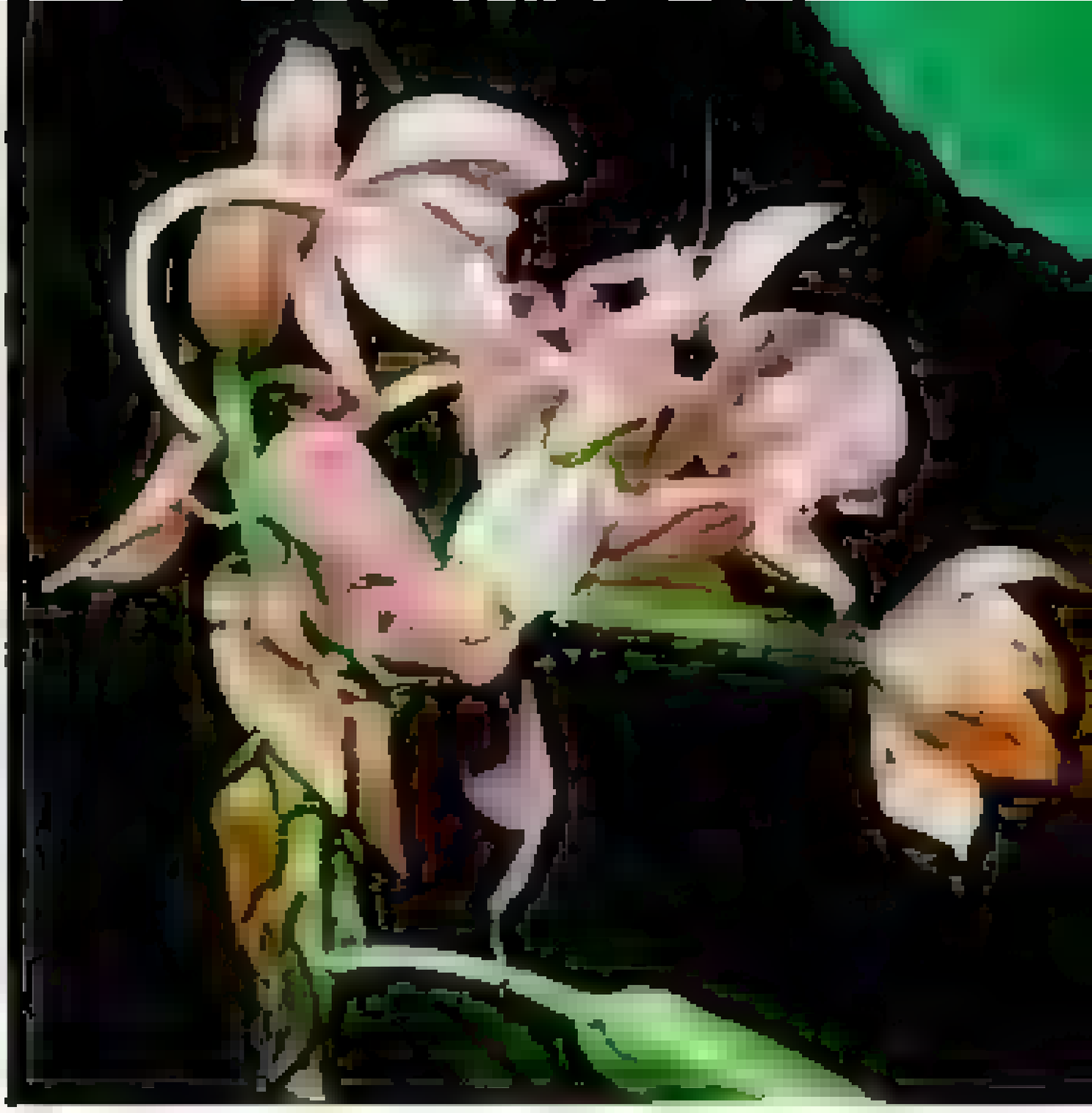
What a perfect masquerade! The insect's body matched the flower in amazing detail.

This astonishing insect was a spectacular example of a common phenomenon of flower resemblance, found in tropical mantids as well as other

DEATH IN A FLOWER: *Malayan mantis closely mimics pink orchids of the Gombak Valley. Its prayerful pose belies a fiercely predatory nature. A unwitting and unwary victim that mistake it for a blossom and land within its reach.*







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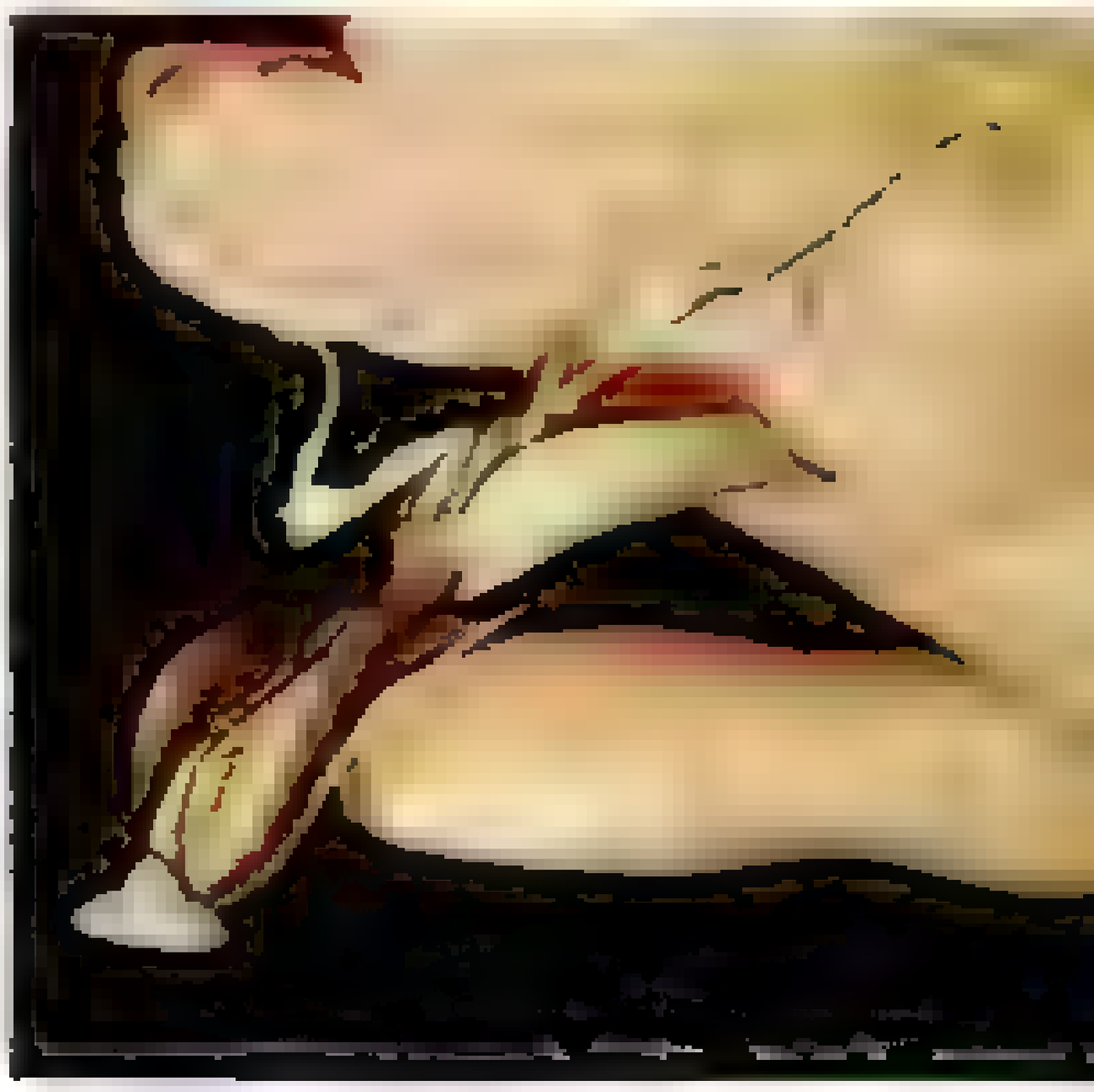

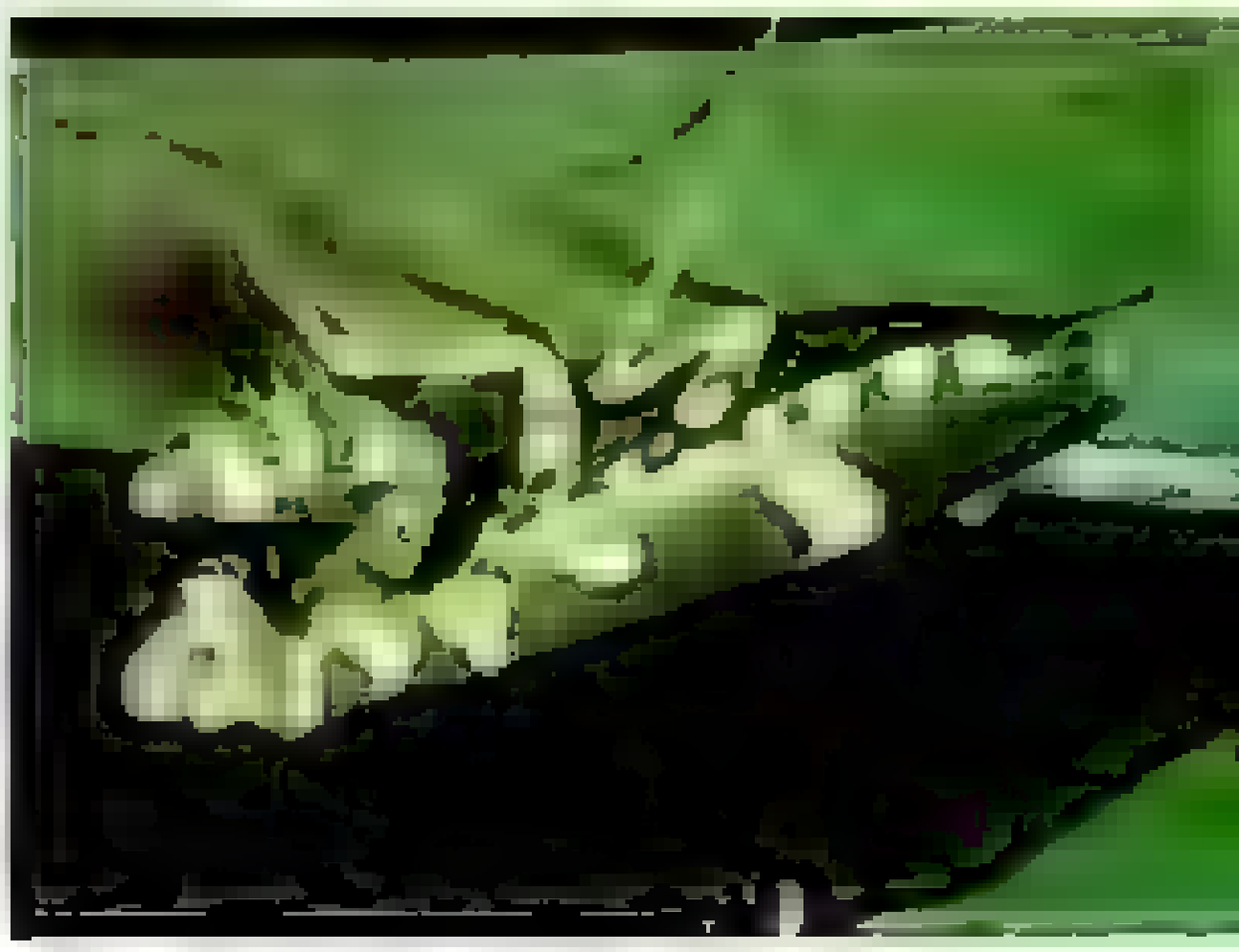

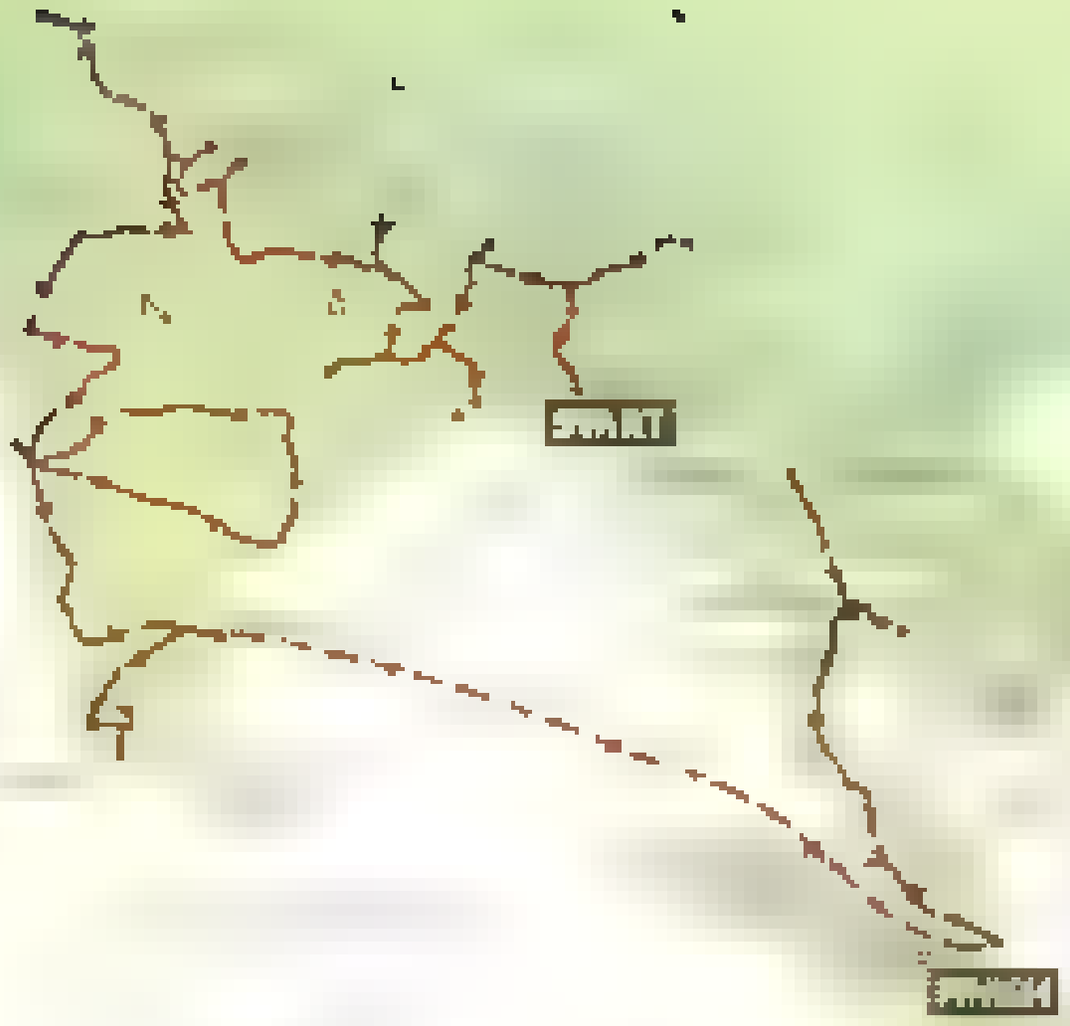
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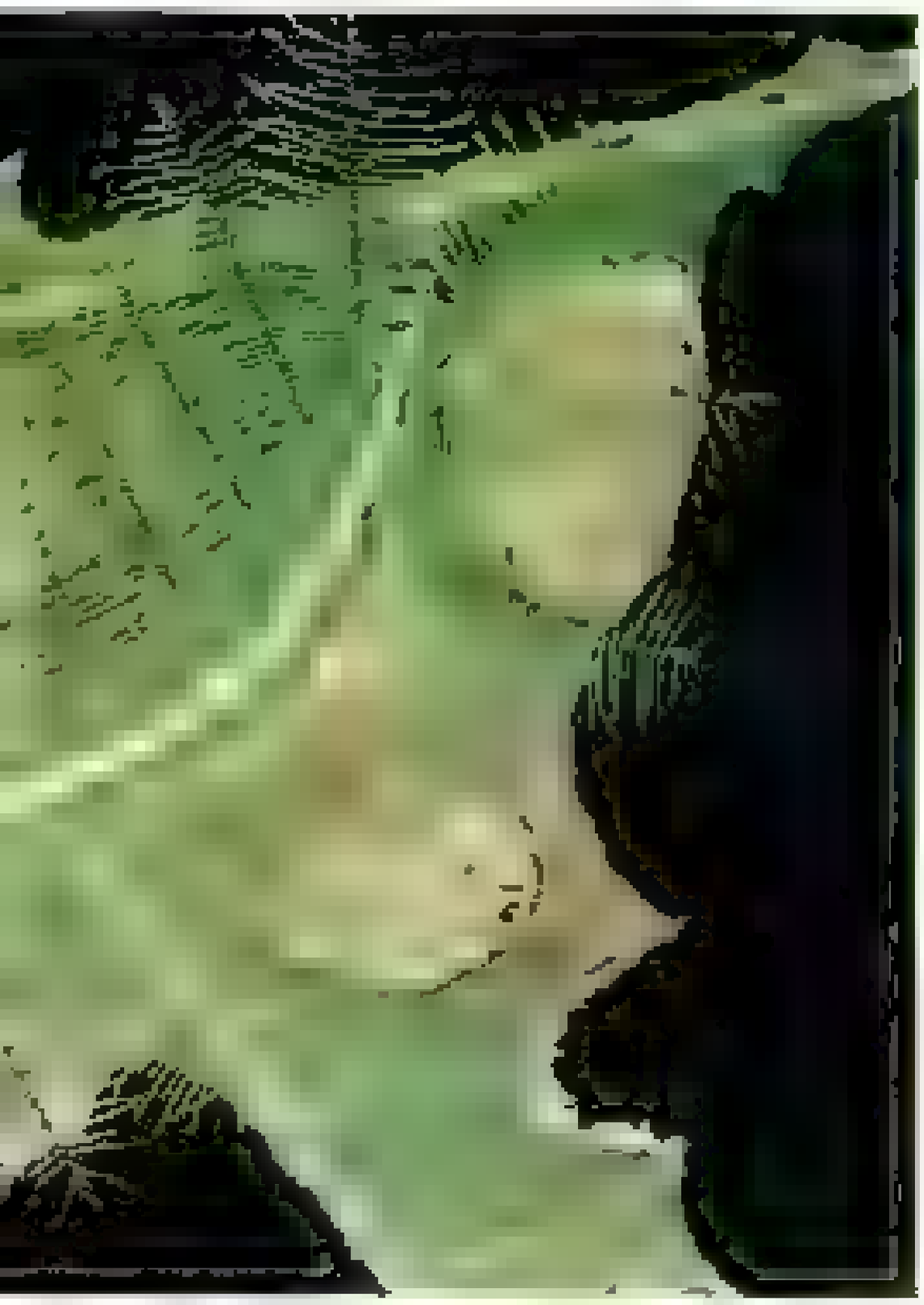
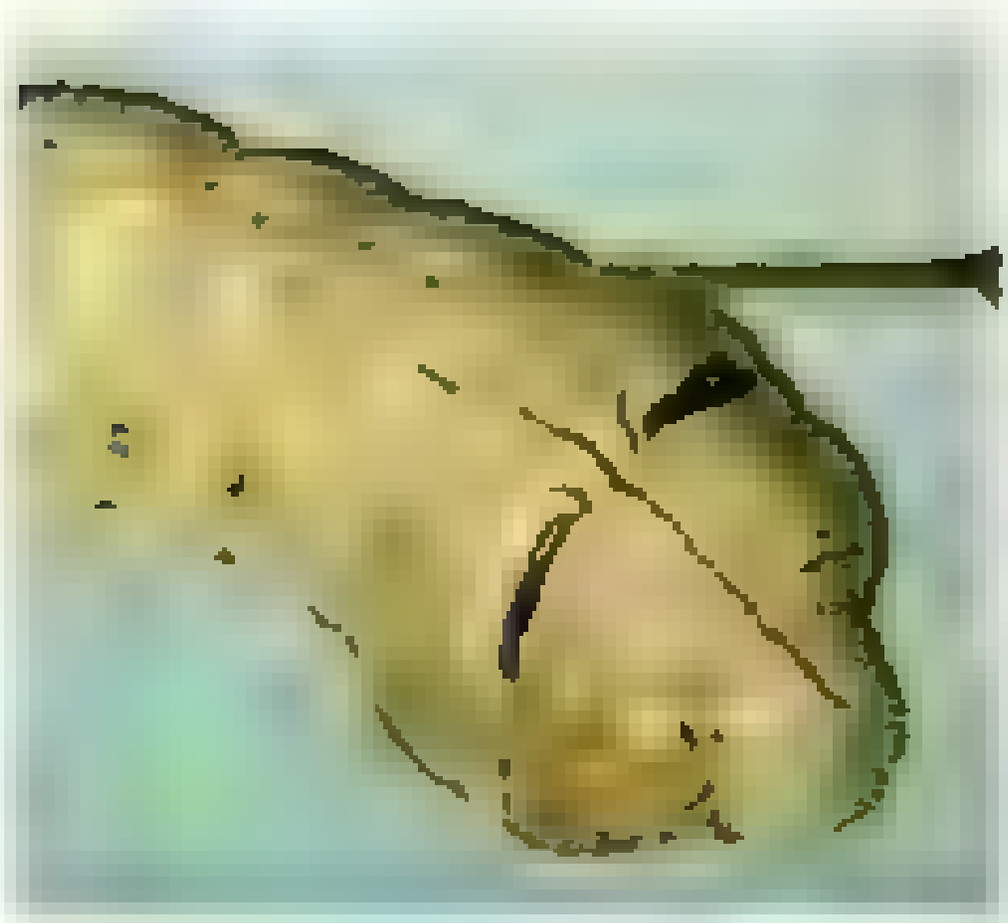
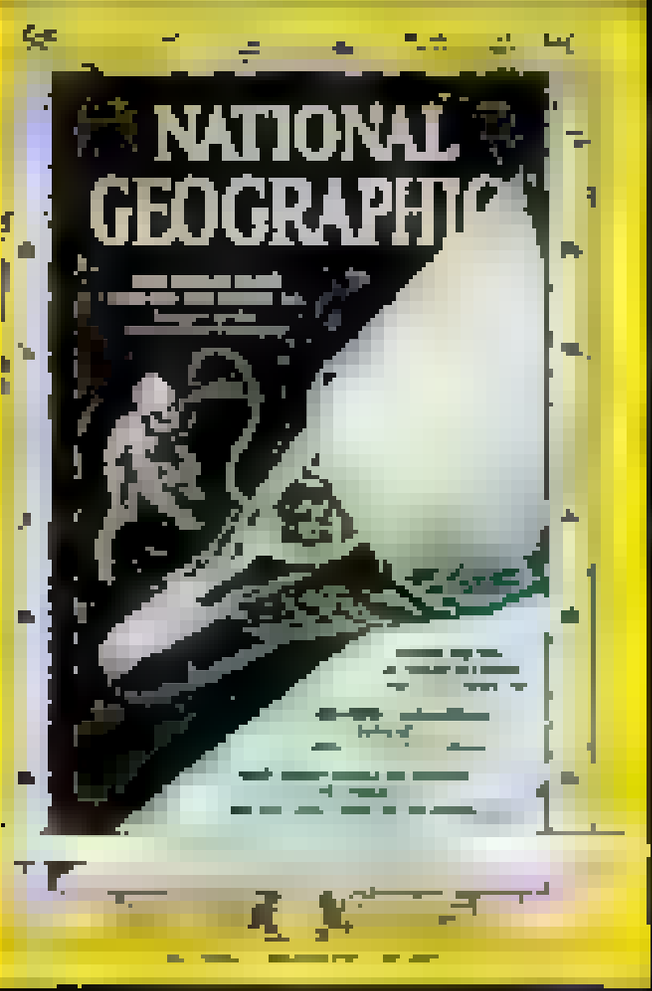


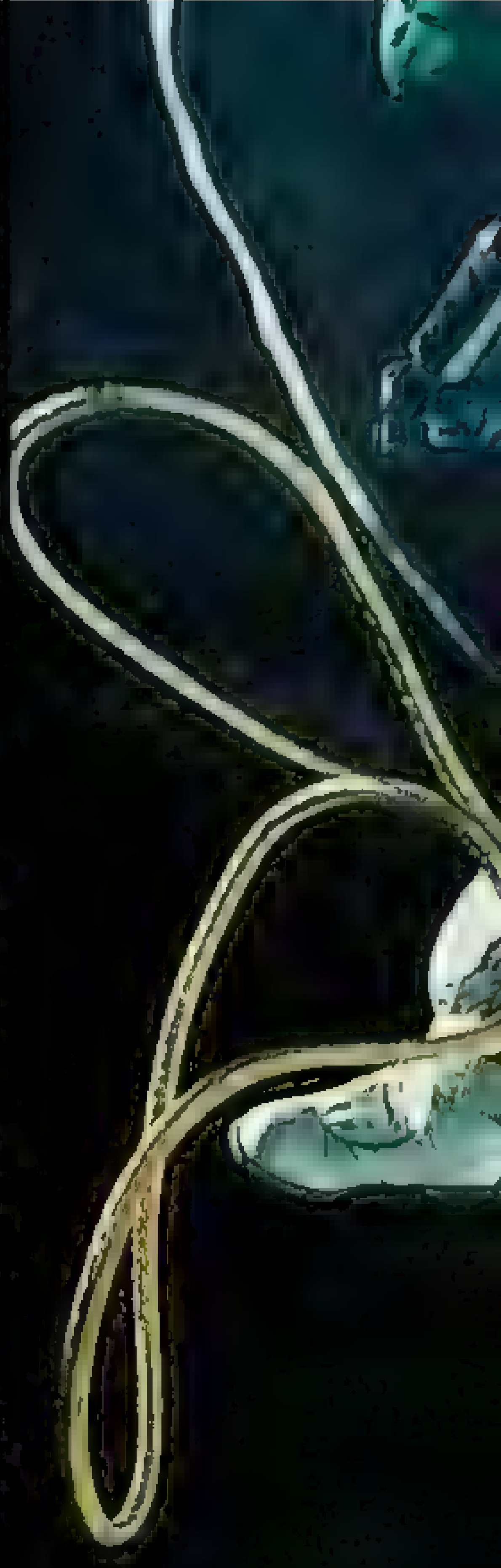


America's 6,000-Mile Walk in Space

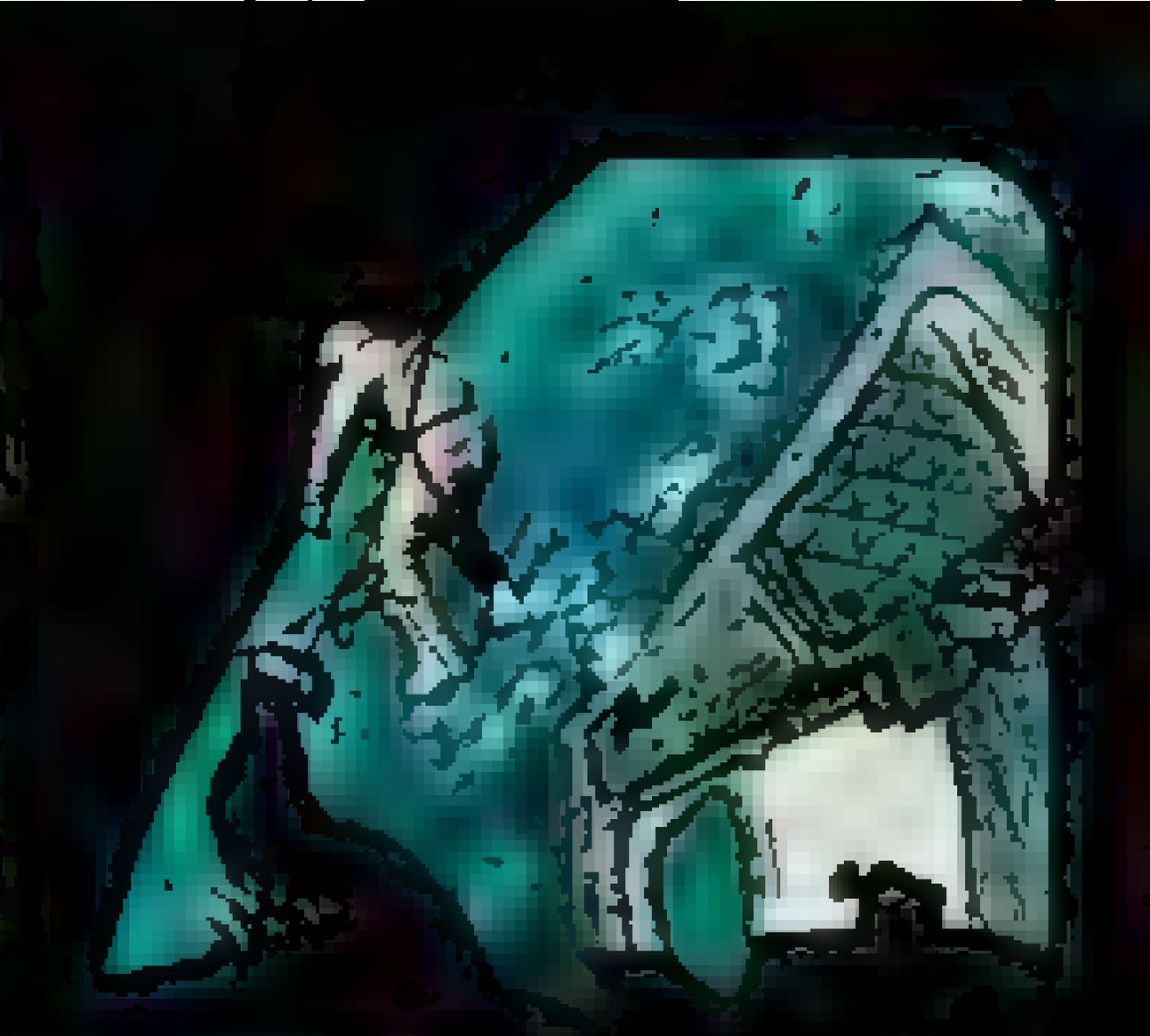
TETHERED by a looping, golden umbilical cord, Maj. Edward H. White II moves freely 100 miles above earth. The historic date, June 3, 1965, marks man's longest walk in the deadly vacuum of space. The American astronaut, using the guidance gun in his right hand, maneuvered at will until its compressed oxygen ran out. He thus became the world's first self-propelled space man. Though orbiting at 17,500 miles an hour, the space walker "had little sensation of speed and no sensation of falling, only a feeling of accomplishment." Millions of earthlings heard White talk with Gemini 4's command pilot, Maj. James A. McDivitt, during the 21-minute sortie into space.



Prophetically, NATIONAL GEOGRAPHIC pictured this incredible feat 13 months ago, in its March, 1964, issue (inset). In the accompanying article, Dr. Hugh L. Dryden, a Society Trustee since 1951, visualized the day when a Gemini pilot would leave his ship and stroll among the stars. As Deputy Administrator of the National Aeronautics and Space Administration, Dr. Dryden plays a vital role in NASA's manned flight program, which made possible the dramatic photographs on these pages. GEOGRAPHIC's cover painting proved amazingly accurate, except that the tether turned out to be plated with gold instead of silver, and the emergency oxygen pack rode White's chest rather than his thigh.




McDIVITT: "He's getting out right now." White makes his first exploratory



moce into space, propelling himself in a controlled turn to the left.

ROSY GLOW OF SUNRISE over the Pacific burnishes White as he stands in the seat (upper left, opposite) and thrusts himself into space with the maneuvering unit. The tie-down strap of his helmet floats free, catching a shaft of light. White moves away from the ship (other pictures) as McDivitt holds the spacecraft steady. Shadow of the mounted movie camera that took these extraordinary photographs appears on the open hatch door at lower right. Three times, as he stood in the seat, White had checked this 16-mm. sequence camera.

"I wanted to make sure I didn't leave the lens cap on," he said later. "I knew I might as well not come back if I did."

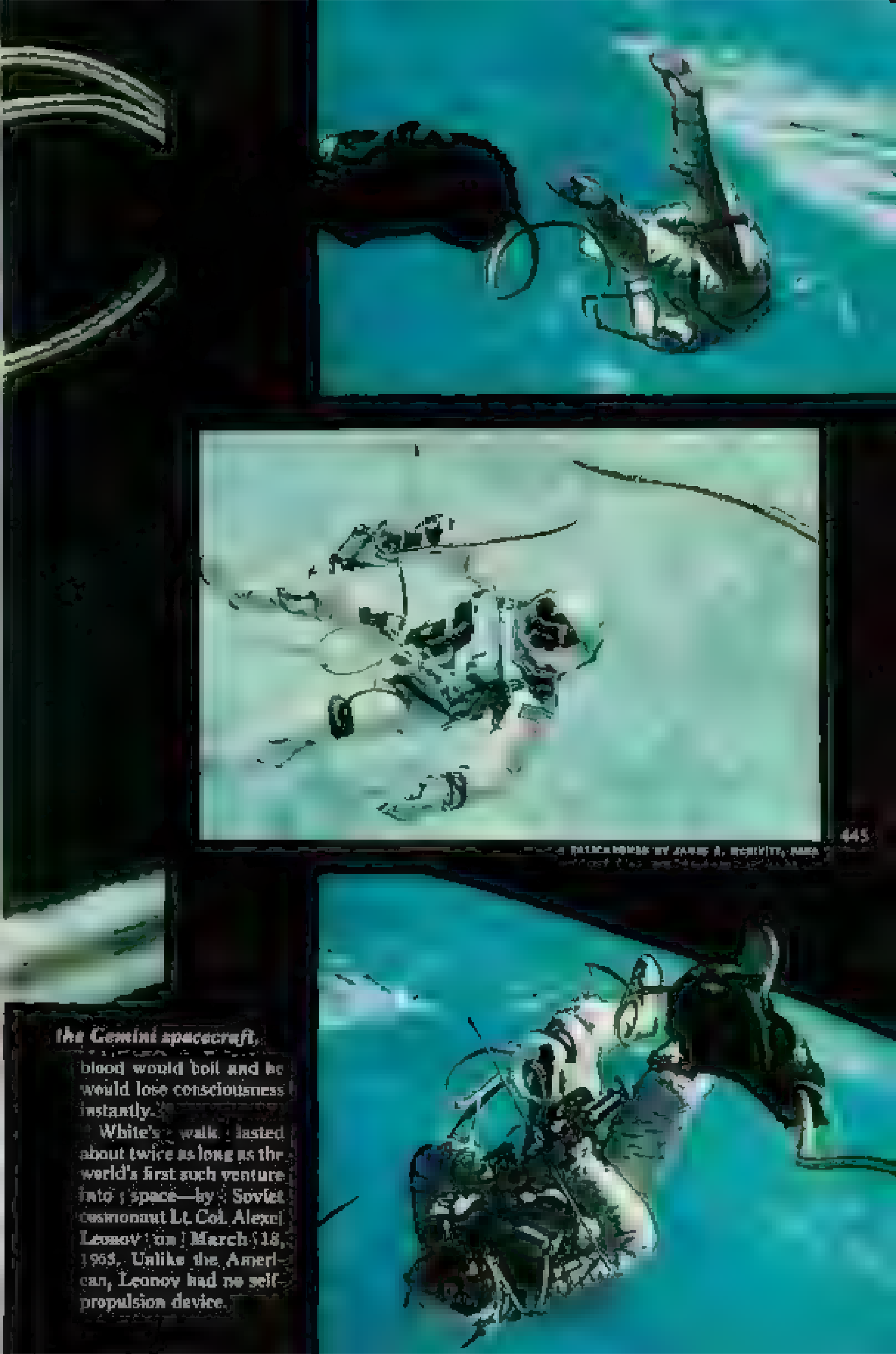
Curvature of the earth as seen by the astronauts was not as pronounced as it appears here. "The camera's wide-angle lens exaggerates the curve of the horizon slightly," McDivitt explained after the flight.

At left, the spacecraft approaches the California coast. "I was taking some big steps," said White, "the first on Hawaii, then California, Texas—lightly, in deference to the President—Florida, and the last on the Bahamas and Bermuda. The gun worked superbly; I just wish I had had more oxygen. Changing my position by pulling on the tether was easy, like pulling a trout, say a two- or three-pounder, out of a stream on a light line."

From the moment he stepped outside to his reclosing of the hatch, White's seven-league boots covered some 6,000 miles.

McDIVITT: *"Let me take a close-up picture of you."* White's visor mirrors

THUS THE PILOT converses with his "vagabond passenger" via the 27-foot umbilical cord that supplied voice communication as well as life-sustaining oxygen. His gun now exhausted, White does a tumbling act (upper right) by means of the tether extracted from the olive-green stowage bag. In a world that knows no up or down, the outrider feels no discomfort, no disorientation, he later reported. As he floats serenely on his back above earth's cloud cover (center), the Stars and Stripes shines proudly on his shoulder. Pulling on the tether (lower right), he approaches the spacecraft. McDivitt meanwhile focuses on his partner through a hatch window. Here, and on page 441, he captures some of the most breathtaking color photographs ever made. Moments later, White's left shoulder and elbow touched McDivitt's window and evoked a loud complaint: "You smeared up my windshield, you dirty dog." Far below, spellbound listeners the world over chuckled at this fantastic bit of banter in the heavens. Without a pressurized suit, an astronaut's



the Gemini spacecraft, blood would boil and he would lose consciousness instantly.

White's walk lasted about twice as long as the world's first such venture into space—by Soviet cosmonaut Lt. Col. Alexei Leonov on March 18, 1965. Unlike the American, Leonov had no self-propulsion device.

EXTACHROME FROM HIGH-RESOLUTION CAMERA, 1966

ONE OF WHITE'S SPACE GLOVES *floats into space to become an accidental satellite. Santa Rosa and Santa Cruz Islands pass below. White, as he reports: "I can sit out here and see the whole California coast."*

DRAWING BY ROBERT SOBELL © 1965

WHITE'S THUMB-UP SIGNAL OF SUCCESS and McDivitt's broad smile proclaim two joyous but weary astronauts on the recovery carrier *Wasp* in the Atlantic. "I was the happiest man in the world that day," said McDivitt, "except possibly for Ed." White admitted, "I felt so good I didn't know whether to hop, skip, jump, or walk on my hands." He did a jig step as he walked to the captain's quarters, where the Gemini twins talked by radio-telephone with President Johnson and received his plaudits for the four-day, 66-orbit, 1,700,000-mile flight. Their excellent condition delighted doctors.

Both Air Force officers, the astronauts were promptly nominated by the President for promotion to lieutenant colonel. "If I had seen your space flous before," he told them, "I might have promoted you to full colonels."

Major White, born in San Antonio, Texas, graduated from West Point in 1957 and later became a test pilot. Before entering the space program himself, he flew a total of five weightless hours while piloting a transport in which astronauts rode during training for the weightlessness of space. Resuming college studies while an Air Force officer, Major McDivitt, of Jackson, Michigan, graduated from the University of Michigan in 1959, first in his engineering class of 607. In the Korean War he flew 145 combat missions.

National Geographic's newest adventure: a color television series

W

DECEMBER 22: MISS GOODALL IN AFRICA

[illegible] the first [illegible] NATIONAL GEOGRAPHIC programs scheduled for the 1965-66 television season on the Emmy [illegible] presenting these films in other countries [illegible] have been [illegible] the Nation's Capital [illegible] States have [illegible] and [illegible] brought back [illegible] to illustrate their talks. For our motion picture phase [illegible] began in 1958, when Arctic explorer Ann Bancroft took a [illegible] for the GEOGRAPHIC [illegible]

[illegible] marked the [illegible] of the [illegible] Film Richard [illegible] found History. The [illegible] who sponsored [illegible]

[illegible] years we have wondered how [illegible] could share such programs with members [illegible] D.C. Television seems [illegible] GRAPHIC sets in the magazine for [illegible]

that CBS chose "American Land Contest" as its first color presentation of the season [illegible] television four years ago [illegible] one of the industry's old-[illegible] producers [illegible] Robert C. Davis. Harvard-educated [illegible] and [illegible] started in TV at the [illegible] Since he was director [illegible] from 1952 through [illegible] three networks, [illegible]

APRIL 27: WORLD OF COCKTAILS

FEBRUARY 14: [illegible]

AMERICANS ON EVEREST [illegible]

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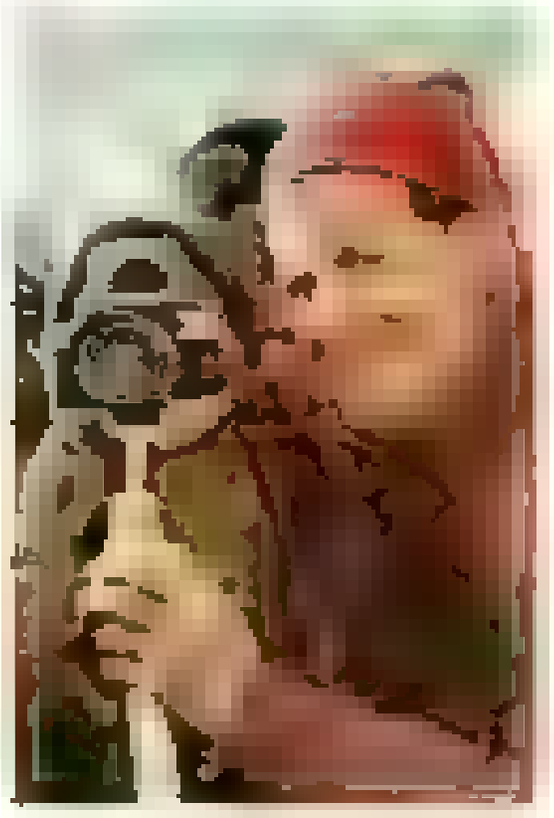

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WATCH AMERICAN EXPLORER ON SELECTED TELEVISION STATIONS

A few stations may schedule the program at a later date. Check your newspaper for day and time.

Birmingham WBRC-TV (13)
Dothan WTVY (12)
Montgomery WCOV-TV (20)

Phoenix KTAR-TV (10)
Tucson KGUN-TV (9)

Fort Smith KFSA-TV (5)
Little Rock KTHV

Bakersfield KERO-TV (23)

Grand Junction KREX-TV (5)

Hartford WFSB-TV (3)

Washington WTOP-TV (9)

Fort Myers WINK-TV
Orlando WFTV (9)

Atlanta WSB-TV (2)
Columbus WRBL-TV (3)
Macon WMAZ-TV (13)

Honolulu KHON-TV (2)
Idaho Falls KID-TV
Twin Falls KLIX-TV (13)

Champaign WCIA (3)
Chicago WGN-TV (9)
Quincy WGEM-TV (10)
Rock Island WHBF-TV (4)

Evansville WFIE (5)
Fort Wayne WANE-TV
Indianapolis WTTV (4)

Cedar Rapids
Des Moines
Sioux City KCAU-TV (9)

Wichita KTVH (12)
Topeka WIBW-TV (13)
Lexington WLEX-TV (18)
Louisville WHAS-TV (11)

Baton Rouge WBRZ-TV (2)
Lafayette KLFY-TV (10)

Baltimore WMAR-TV (2)
Salisbury WBOC-TV (16)

Cambridge
Traverse City WPBN-TV
Lansing WLNS-TV (6)
Saginaw-Bay City WNEM-TV (5)

Minneapolis
Mississippi
Columbus WCBI-TV (4)
Greenville WABG-TV
Jackson WJTV (12)
Meridian WTOK-TV (11)

Lincoln KOLN-TV (10)
Omaha WOWT (6)

Las Vegas KLAS-TV (8)
Reno KOLO-TV (8)

Albany WTEN (10)

Rochester WHEC-TV (10)
Syracuse WSYR-TV (5)

Durham-Raleigh WTVD (11)

Grand Forks KXJB-TV (4)
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Akron WEWS-TV (5)
Cleveland WJW-TV (8)
Columbus WBNS-TV (10)
Dayton WHIO-TV (7)
Steubenville WSTV-TV (9)
Toledo WTOL-TV (11)
Youngstown WFMJ-TV (21)

Ardmore KXII (12)
Oklahoma City KOCO-TV (5)
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Eugene KEZI (9)
Medford KDRV-TV (5)
Portland KGW-TV (8)

Allentown WFMZ-TV (69)
Erie WSEE (35)

Lancaster
Lebanon WLYH-TV (15)
Philadelphia WCAU-TV (10)
Pittsburgh KDKA-TV (2)
Wilkes-Barre WBRE-TV (28)
York WSBA-TV (43)

Charleston WCHS-TV (8)
Huntington WSAZ-TV (3)

Columbia WNOK-TV (19)
Florence WBTW (13)
Spartanburg WSPA-TV (7)

Rapid City KOTA-TV (3)
Sioux Falls KELO-TV

Chattanooga WDEF-TV (12)
Jackson WBAL-TV (7)
Johnson City-Bristol
Kingsport WCYB-TV (11)
Knoxville WBIR-TV

Amarillo KFDA-TV (10)
Austin KTBC-TV (7)
Beaumont KFDM-TV (6)

El Paso KROD-TV (4)
Harlingen KGBT-TV (4)

San Angelo KTCW (8)
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Abilene KRBC-TV
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Salt Lake City KSL-TV (5)

Burlington WCAX-TV (3)

Boston WBZ-TV
Springfield WWLP (22)
Norfolk WTAR-TV (3)
Richmond WTVR (6)

Wheeling WTRF-TV (9)

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Madison WISC-TV (3)
Milwaukee WISN-TV (12)

Casper KTWO-TV (2)
Riverton KWRB-TV (10)

*see neighboring states

back to 1913, when the companies began advertising in the pages of this journal. Similarly, over the years Aetna has insured Society expeditions—including a policy for the Everest expedition itself.

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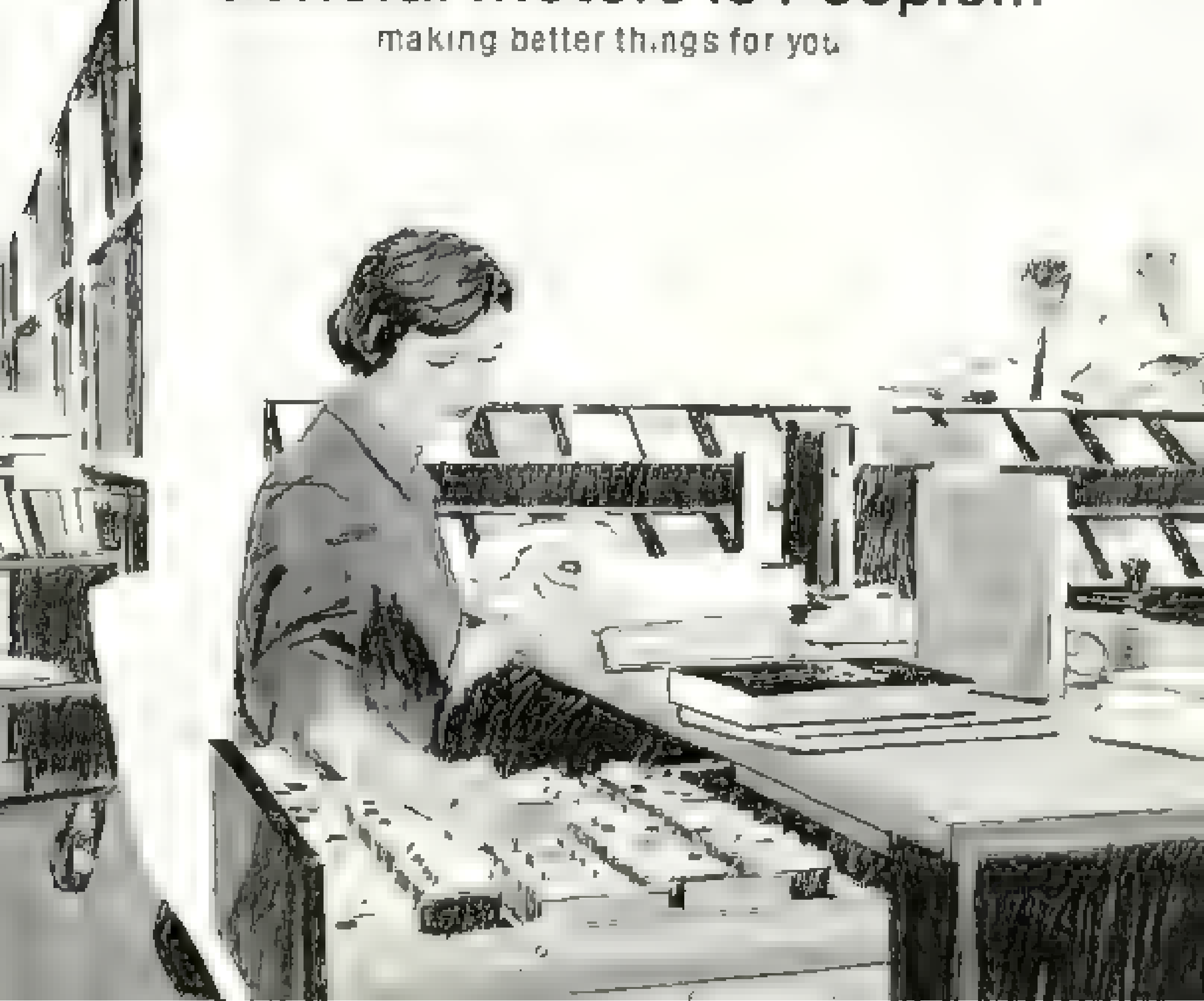

Geographic committee meets a research subject

FRESHLY CLIMB IN Tanzania's Gombe Stream [illegible] Research [illegible] [illegible] Dr. [illegible] Chairman of the National Geographic Society Committee for Research and Exploration, Dr. Melvin M. Payne, Executive Vice President of the Society, and Dr. [illegible] Stewart, [illegible] Institute's Museum. [illegible] traveled to Europe and East Africa with other committee members for on-the-spot [illegible] [illegible] Leon Primate Research [illegible] Museum, Jacques-Yves Cousteau [illegible] his underseas research.

Such world-wide Society projects [illegible] membership form below [illegible] reports regularly in NATIONAL GEOGRAPHIC.

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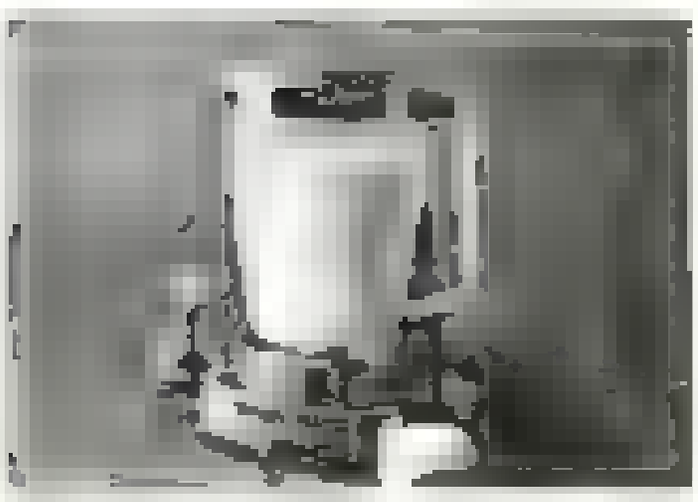

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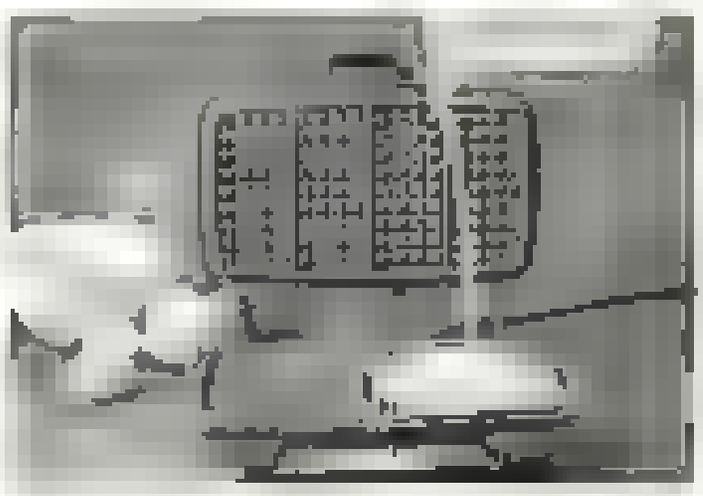

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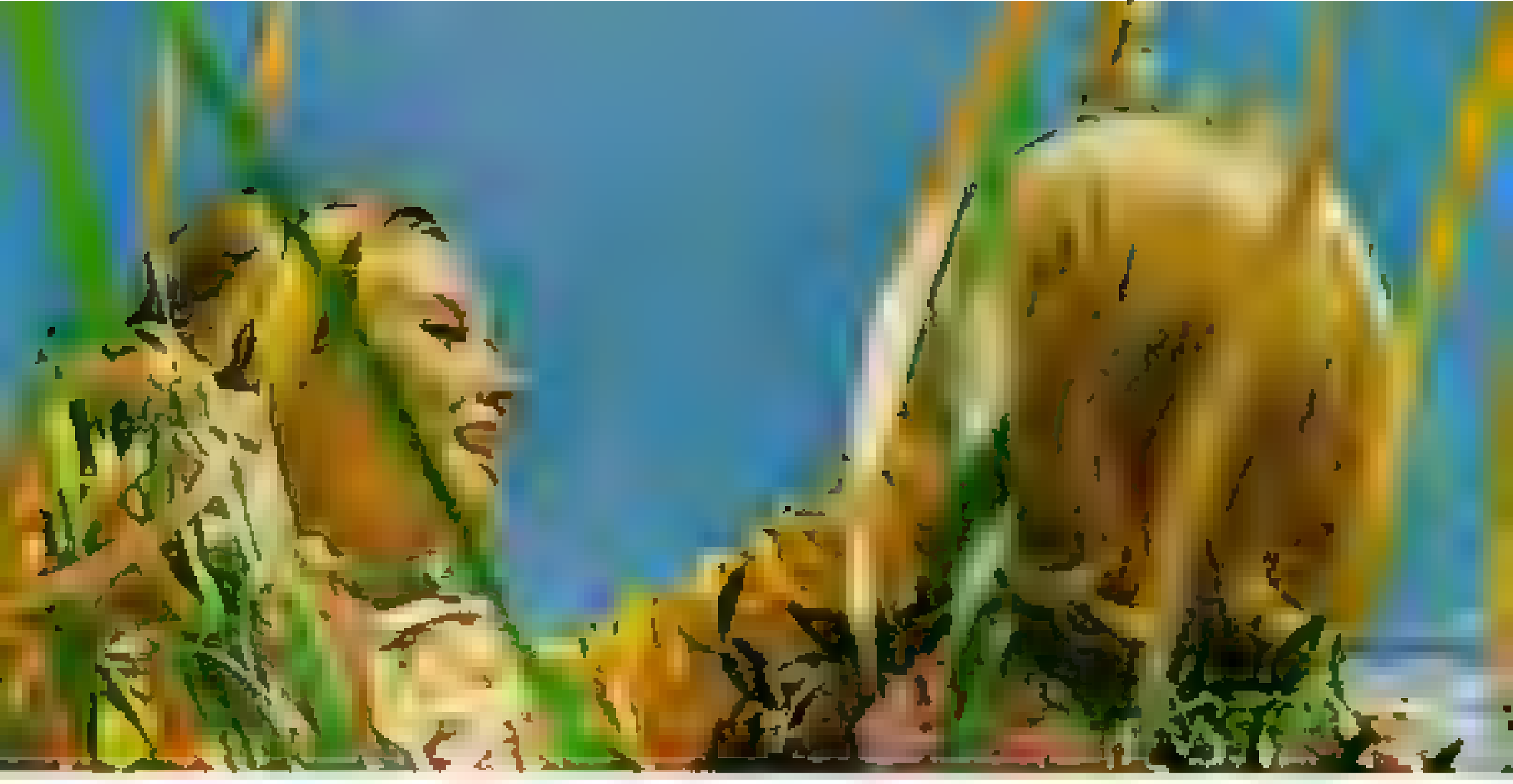
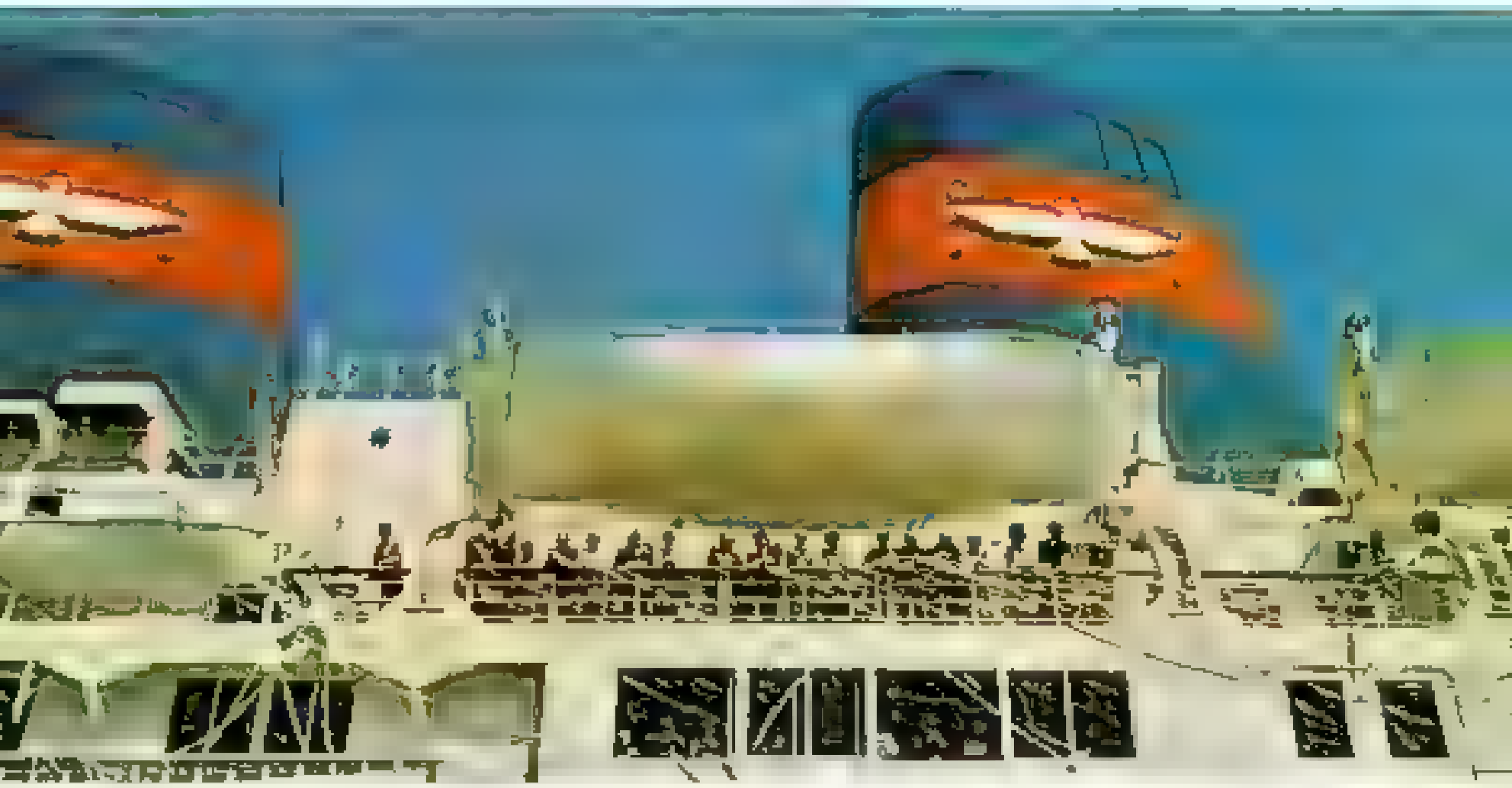


Why the lady on the Promenade Deck



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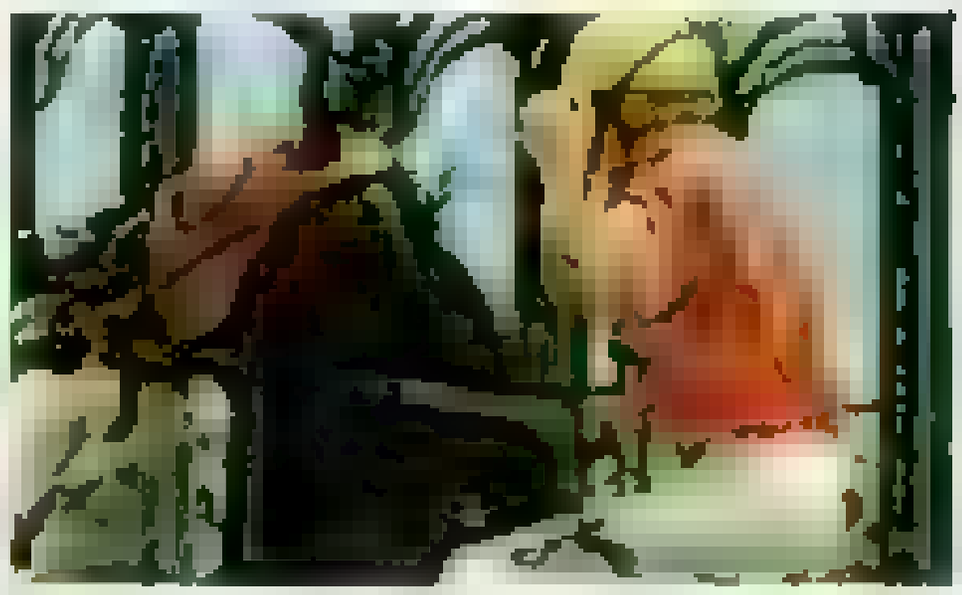

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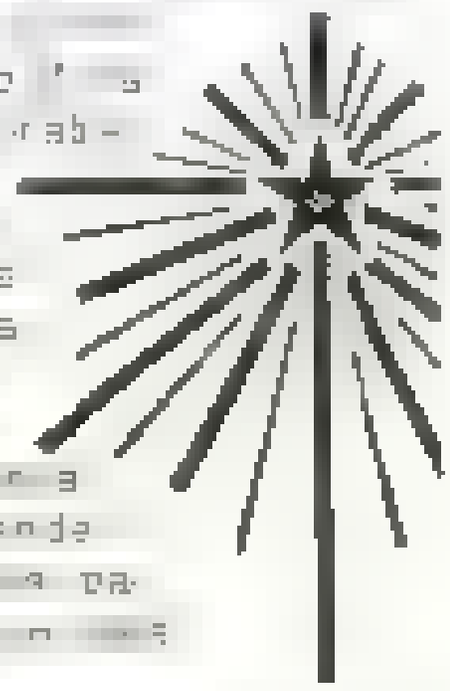

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The place to go is

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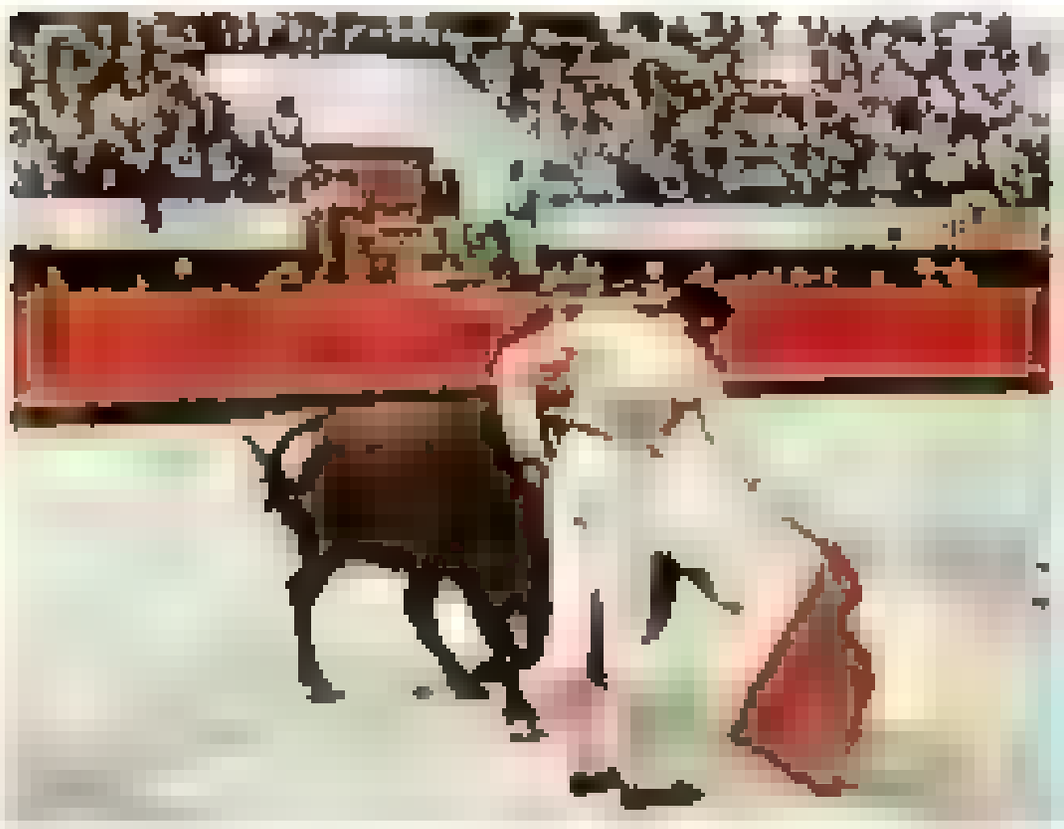

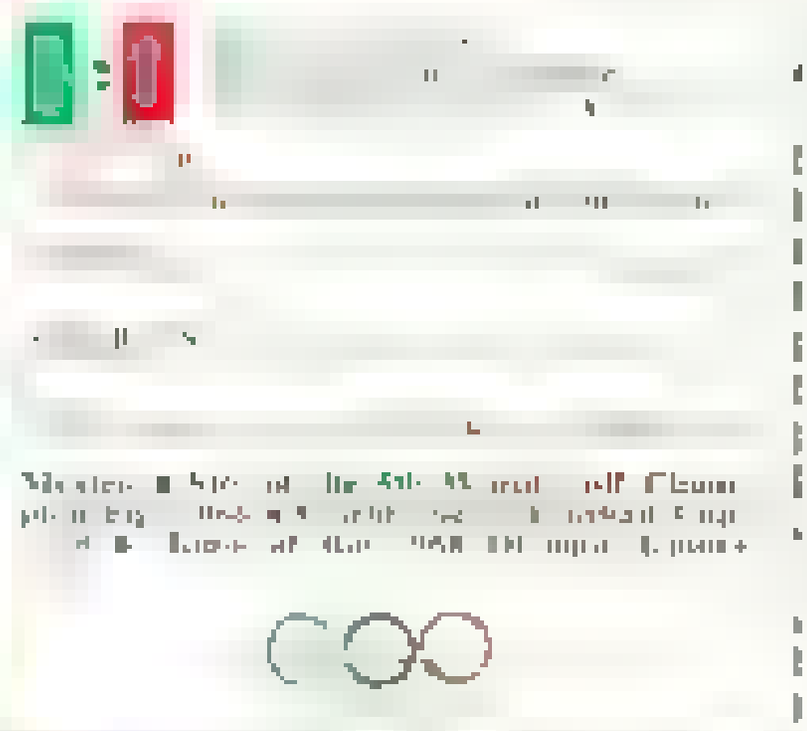

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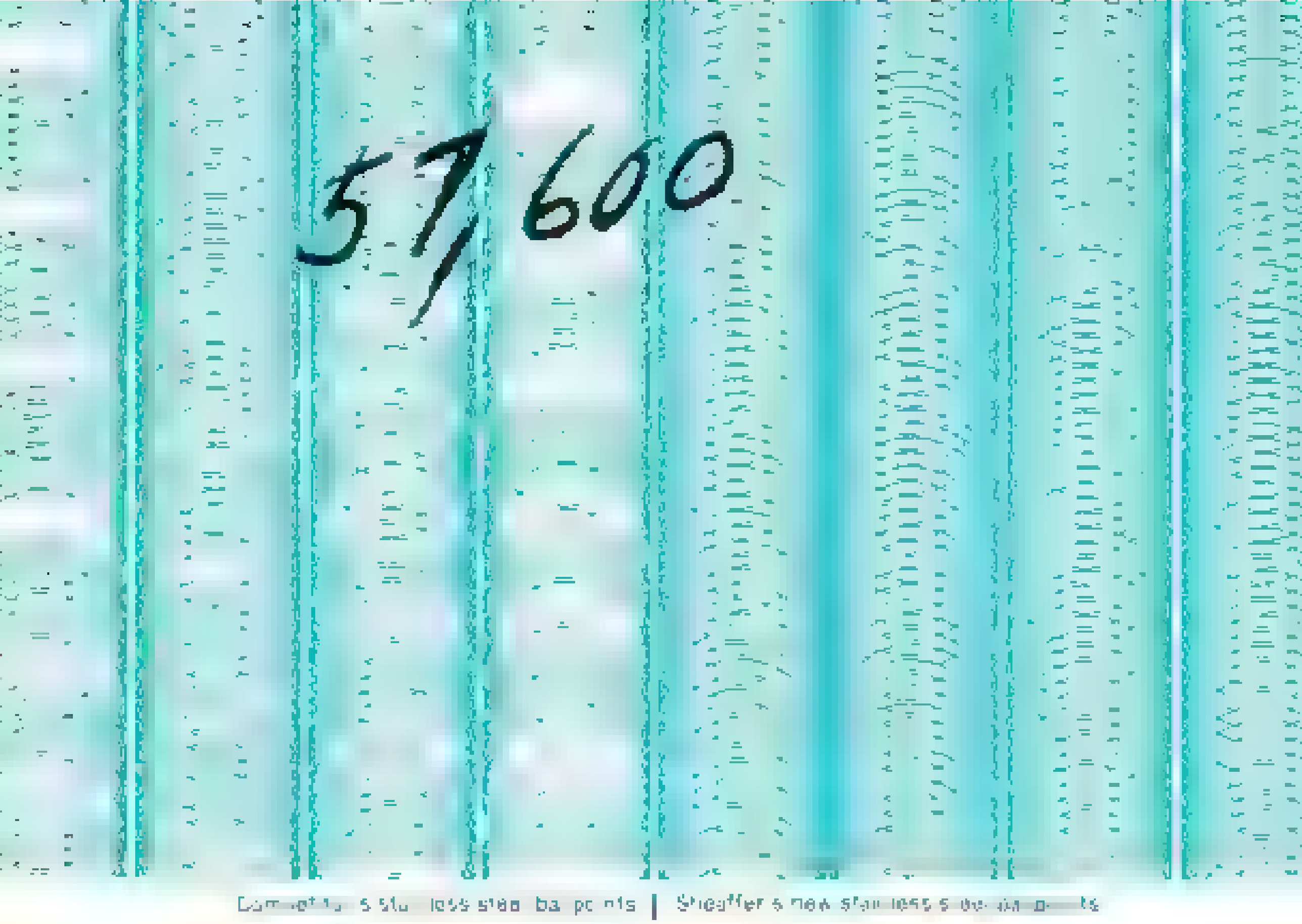
either make it yourself or make it with Knorr!

This is a new Knorr Garden Vegetable Soup. A fantastic new soup that tastes just like you made it yourself. Knorr starts with eleven different farm crisp vegetables, adds tender egg noodles and, of course, Knorr's famous European seasoning secret. Now in only 10 minutes you can serve your family the kind of vegetable soup it would take hours to make yourself. Soup with cream flavor.



Sheaffer's new stainless steel ballpoints go around in the best circles

This is part of a sheet from one of our automatic writing machines. 57,600 circles were made by stainless steel ballpoint refills. Those on the left are faded and skipping. Those on the right, made by the new Sheaffer, are still uniform. The circles prove that the stainless steel tip alone cannot match Sheaffer's perfect combination of ball, tip, and writing fluid.

Sheaffer researchers started with the textured ball and found a way to remove the microscopic "burrs" that cause wear and prevent the ball from turning smoothly. Then they put this textured-polished ball in a stainless steel socket (tip) and reduced wear to practically zero for the life of the ink supply. Next they prepared a special formula of Sheaffer's "Dokumental" Skrip writing fluid to properly lubricate the new ball-tip combination. The result is the most perfect ballpoint writing ever. The new Sheaffer starts writing when you do and lays down a solid line from start to finish. It never skips or smudges. It glides smoother, requires less pressure.

All Sheaffer ballpoints of $1.95 and up now have these new improvements. Try one wherever Sheaffers are sold. And the new stainless steel refill will fit any Sheaffer ballpoint you now own. Just 98¢.

No wonder people get attached to their Sheaffer ballpoints

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Open . . . drop in . . . shoot!

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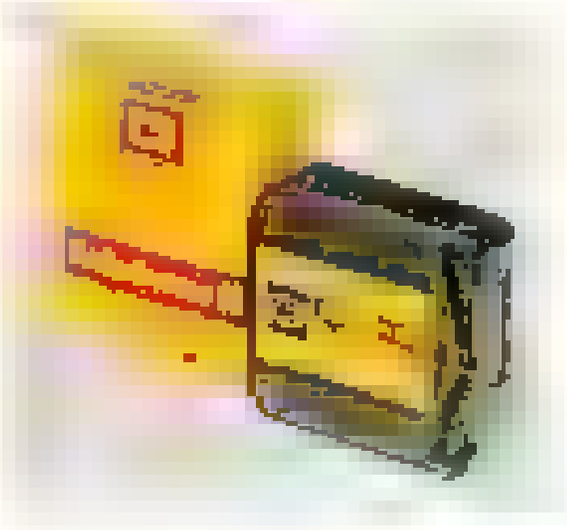
. . and introduces a new era in movie enjoyment

Kodak has redesigned the movie camera. [illegible]

Kodak has redesigned the movie film [illegible]

Kodak has redesigned the movie projector. [illegible]



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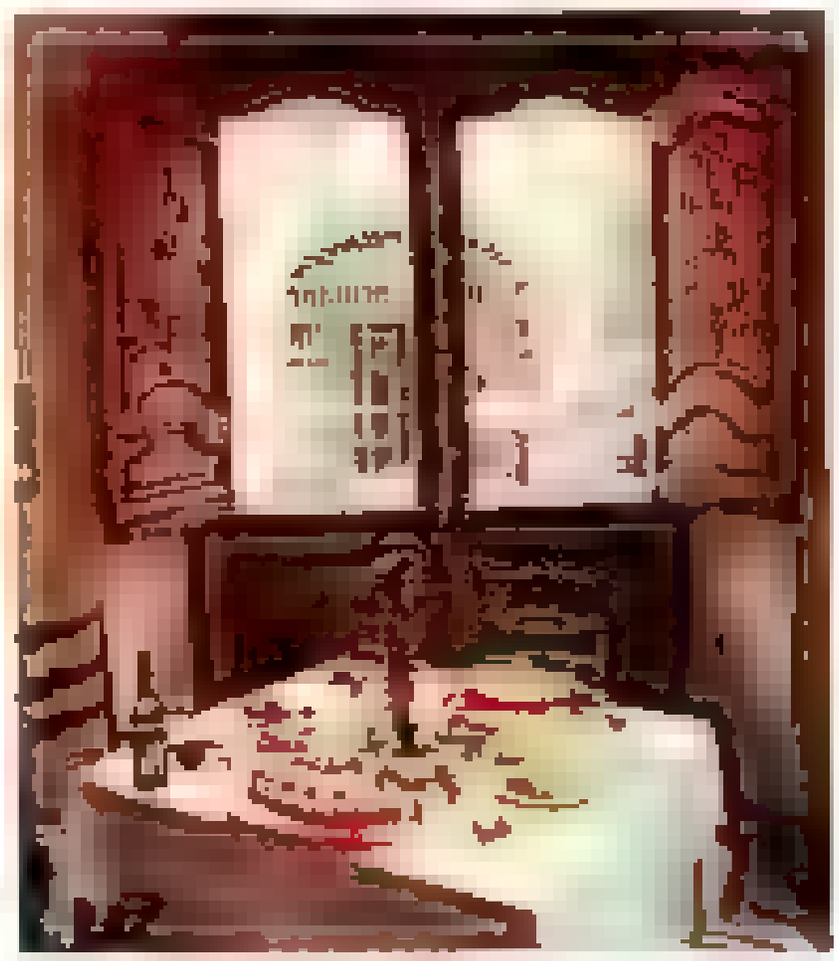

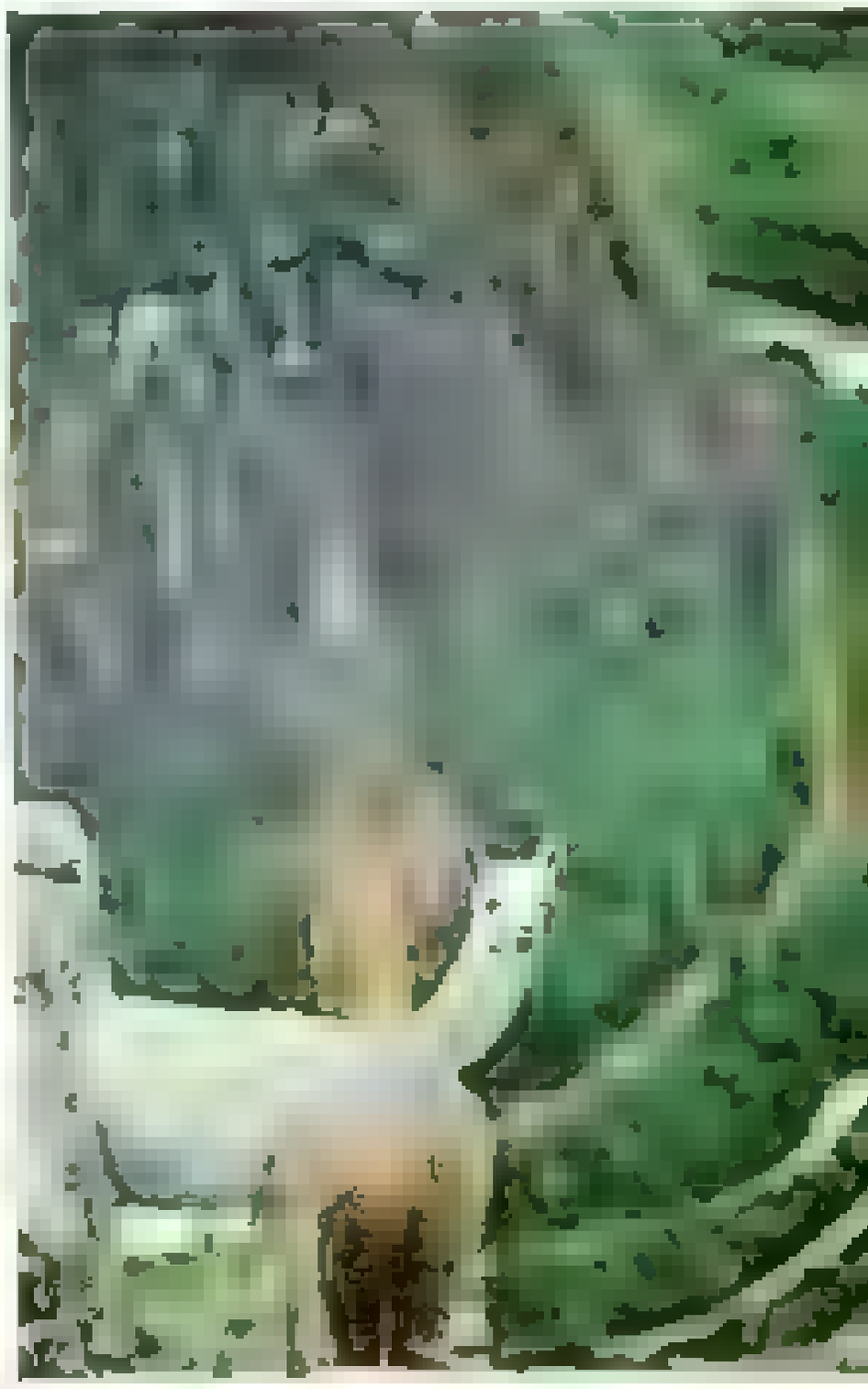

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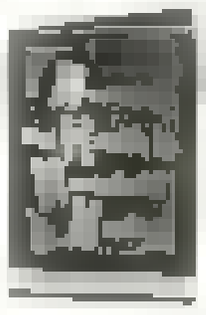

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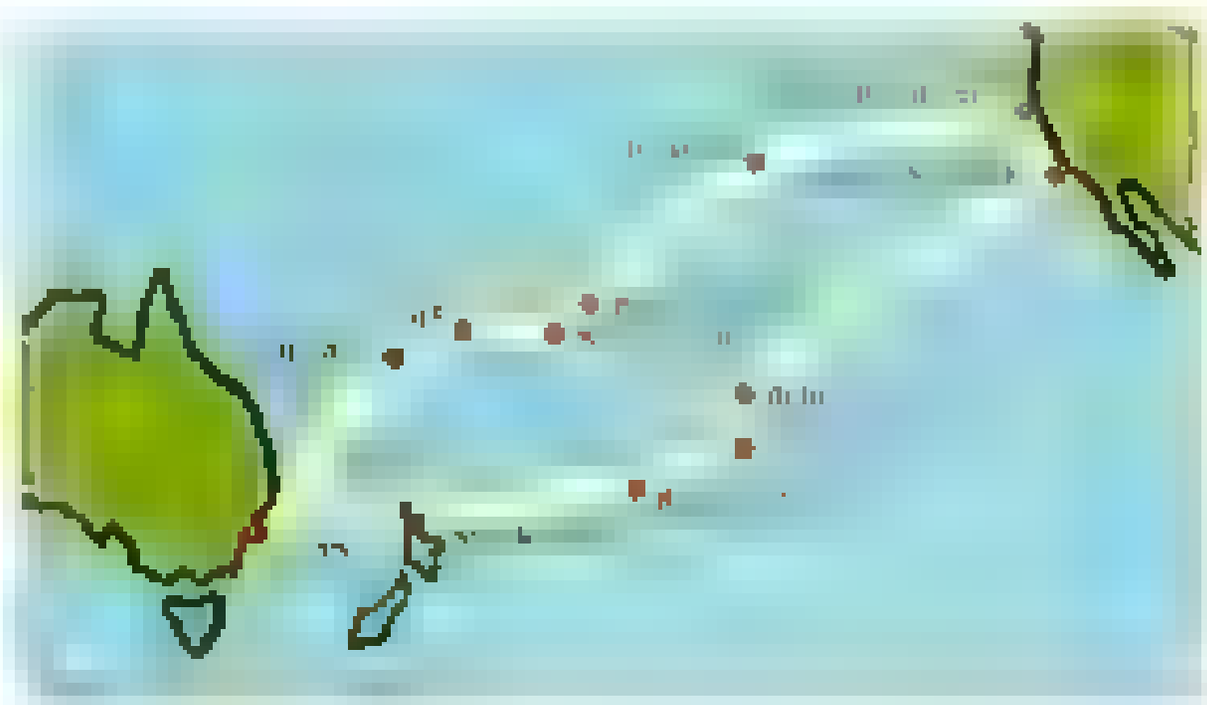

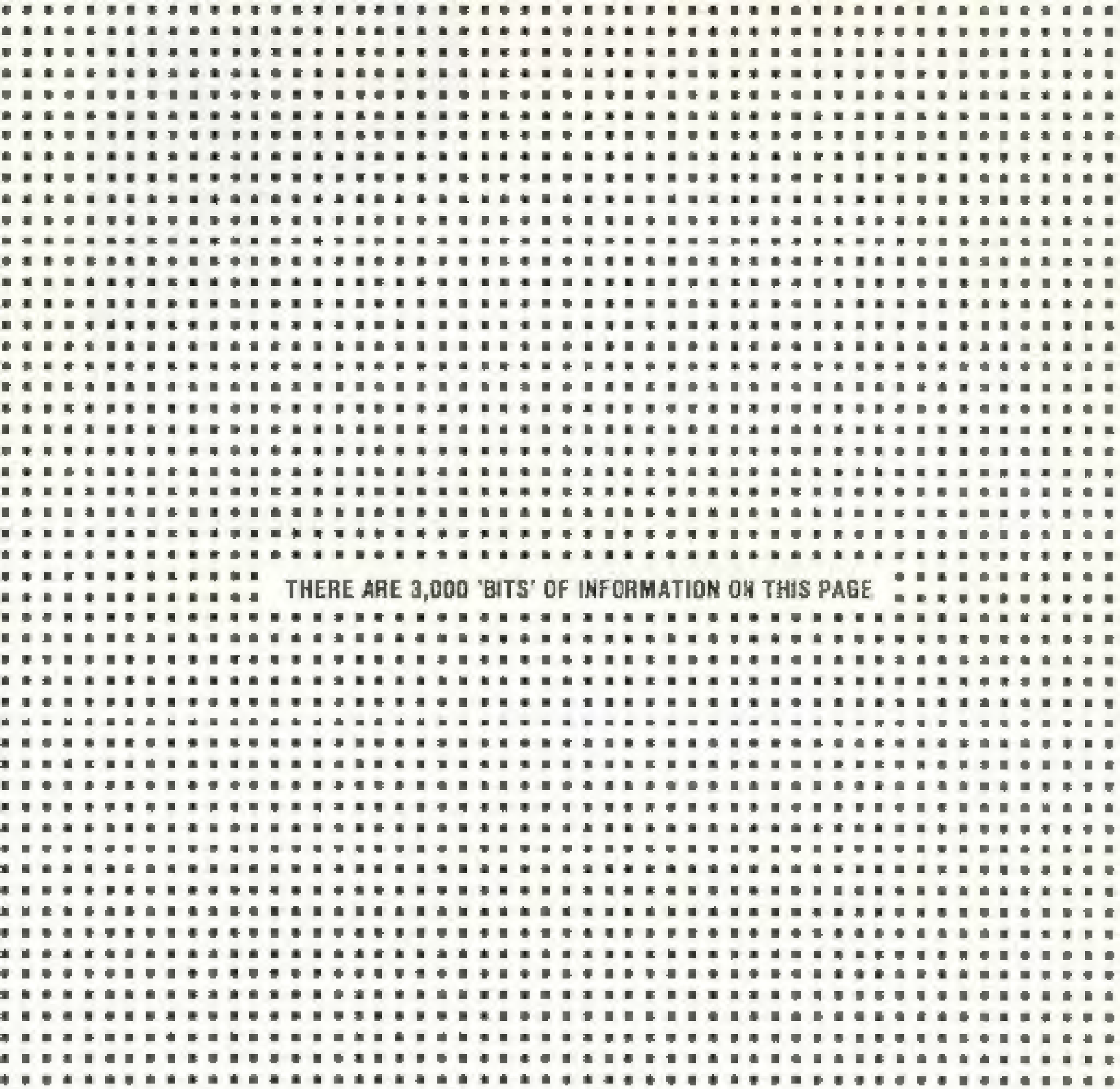

Dots like these are part of an amazing electronic memory that can store, in binary language, 5.8 million "bits" of information. Such a memory unit is a fundamental part of the complex new Electronic Switching System that Western Electric is building for the Bell System. □ The dots are precisely 35 thousandths of an inch square and one thousandth thick. They are etched from magnetic material bonded to a thin aluminum sheet. One hundred and twenty-eight of these aluminum sheets are next placed into a module containing microscopically thin wires embedded in thin plastic to make a complete memory unit. □ This is merely one measure of the complexity of electronic switching. A typical central office equipped for electronic switching requires more than half a million other tiny components, such as transistors. Each of them must meet rigid standards of quality during manufacturing. Only then can they be assembled into units that will work perfectly with every other of the billions of components that make up the nationwide Bell System communications network. □ As the manufacturing and supply unit of the Bell System, we share the goal of bringing you continual progress in communications. Electronic switching—developed by Bell Laboratories, built by Western Electric, operated by Bell telephone companies—is another giant step toward ever-better, low cost communications.

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